

Aus dem Institut für Medizinische Informationverarbeitung, Biometrie und Epidemiologie
der Ludwig-Maximilians-Universität München

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Lehrstuhl für Public Health und Versorgungsforschung

Functioning and health in individuals with hand conditions

Dissertation

Zum Erwerb des Doktorgrades der Humanbiologie
an der Medizinischen Fakultät der
Ludwig-Maximilians-Universität München

vorgelegt von
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aus

Regensburg

2012

Mit Genehmigung der Medizinischen Fakultät
der Universität München

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Tag der mündlichen Prüfung: 15.05.2012

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1 Summary

Background

The hand is the “tool of the tools” (Aristotle). It is one of the most relevant organs connecting human beings to their environment. With the human hand nature has provided us with a highly functional and complex instrument. However, there are various types of conditions and injuries that impact upon the hand and limit its multitude utilization. One can differentiate the types of hand conditions in conditions of the hand, considered as disorders, diseases or injuries located directly at the hand, such as carpal tunnel syndrome, Dupuytren's disease or fractures of the hand. Furthermore, the hand can be limited due to conditions involving the hand considered as disorders or diseases as well as injuries not localized or originating in the hand but affecting the hand, such as rheumatoid arthritis, stroke, multiple sclerosis, Parkinson's disease or brachial plexus injuries.

All individuals with hand conditions, irrespective of the type of hand condition, have to cope with substantial challenges in daily functioning. Since the hand serves us in numerous daily activities, a function deficit in the hand can have significant impact on independence, employability and the ability to perform all required tasks in day-to-day life. The problems patients experience are not only related to functions of body systems (e.g. mobility of joints) or to body structures (e.g. bones of hand), but may also affect a person's ability to successfully carry out daily routine in domestic life, self-care, work and leisure activities. While various problems might be common among patients with hand conditions, some are unique and strongly depend on the individual, their culture and social environment. An in-depth understanding of the manifold impact of hand conditions on functioning and health is necessary to integrate the whole person, their individual needs, life issues and environment in patient-oriented treatment and high quality care. Thus, it is important to know in clinical research and clinical practice what areas of functioning are relevant to patients with hand conditions. There is so far no comprehensive instrument or project addressing this issue.

The International Classification of Functioning, Disability and Health (ICF) is one of the World Health Organisation's (WHO) family of international classifications of which the best known is the International Statistical Classification of Diseases and Related Health Problems (ICD-10). In the context of the WHO international classifications, the ICF complements the information on diagnosis, diseases, disorders provided by the ICD-10 by classifying information on functioning and disability. It provides a conceptual framework and a unified standardized language for a more comprehensive description of the experience of patients suffering from a determined disease. Thus, the ICF could be used as a valuable tool to inform about functioning in individuals with hand conditions.

Objectives

The overall objective of my doctoral thesis is to explore, what are the areas of functioning that represent the impact of hand conditions on individuals' functioning and health, using the ICF as operational basis. The specific aims are 1) to answer the question what are the areas of functioning and health addressed in the scientific research on hand conditions and 2) to contribute to our knowledge, what are the most essential areas of functioning in individuals with hand conditions that should be addressed in clinical research and practice. To achieve this objective I, firstly, performed a systematic literature review and analysed the content of published literature on hand conditions and, secondly, performed a study in which, based on statistical analyses, I identified the most essential areas of functioning that best differentiate among the patients' different level of general health.

Study I: "Functioning in scientific research on hand conditions"

The objective of this part of the doctoral thesis is to answer the question what are the areas of functioning and health addressed in the scientific research on hand conditions. The answer to this question will provide a profound knowledge about how hand conditions impact on functioning and health in individuals with hand conditions and will highlight potential gaps in the literature.

For this purpose, a systematic review of published studies on individuals with various types of hand conditions was performed and the content of the retrieved studies was analysed based on the biopsychosocial view of functioning, and health provided by the ICF.

A literature search was conducted in the electronic databases MEDLINE, Embase, PsycINFO, CINAHL, and PEDro, to identify articles published between 1998 and 2008. The International Classification of Functioning, Disability and Health (ICF) was used to identify, group and quantify the information retrieved from the included studies.

In total, 302 studies involving people with hand conditions were included. A content analysis of the selected studies revealed 152 different ICF categories that were addressed in the published literature. It could be shown that, predominantly in the Activities and Participation component, a broad range of functioning domains is well addressed in the literature. However, scientific research activities lack to focus on mental functions such as 'Emotional functions' and further mobility functions such as 'Using transportation'. Particularly studies on conditions of the hand systematically overlook important self-care aspects, such as 'Caring for body parts' or 'Toileting', as well as domestic life aspects. Furthermore, the influence of environmental factors on patient's health status should be considered more thoroughly to increase our knowledge on patients' needs and to ensure patient-oriented care. Moreover, based on the methodology used in this review, an overview of the most frequently used standardized outcome measures and clinical assessments could be provided.

Study II: "Functioning aspects explaining patients' general health"

The overall objective of this part of the doctoral thesis is to contribute to our knowledge, what are the most essential areas of functioning in individuals with hand conditions that should be addressed in clinical research and practice. The first specific aim is to identify a set of ICF categories that contributes most to the variation in patients' general health. The second specific aim is to study, whether the statistical selection of ICF categories is different from an expert-driven selection.

A multi-centre cross-sectional study was conducted including patients with different types of hand conditions from hand trauma units and rehabilitation facilities in Germany. Health professionals performed interviews using the ICF to investigate the impact of hand conditions on patients' functioning and health. Further, patients as well as health professionals rated patients' current general health.

Multivariate regression analyses were applied in several steps to select the set of ICF categories that contributes most to the variation in patients' general health. The statistically identified areas of functioning were further compared to an expert-driven set of ICF categories.

The final set of 33 statistically identified ICF categories encompassed all of the components referring to functioning (i.e. Body Functions, Body Structures and Activities & Participation) as well as a large variety of environmental factors. With the results of this study more than half of an expert-driven selection of ICF categories could also be identified by using a purely statistical approach.

Conclusion

This doctoral thesis demonstrates that functioning is at the core of the experience in individuals with hand conditions. Hand conditions affect a patient's functioning and health in an extensive way and even though they are sufficiently common, their consequences are often underestimated in clinical practice. Clinicians typically focus on the impairments of body functions and body structures overlooking, for example, psychological aspects, day-to-day life situations and an individual's environment. The results of this doctoral thesis reveal that mental function aspects have been largely disregarded in scientific research on hand conditions. At the same time, however, it could be shown that mental functions, such as emotional functions or sleep functions, substantially contribute to a person's general health. The impact of hand conditions on a patient's functioning and health is complex and including mental function aspects is crucial for an integrated understanding of the patients' needs. Further, this work highlights that a patient's physical, social and attitudinal environment deserves more systematically consideration in clinical research. There are considerable gaps in the scientific

literature on hand conditions regarding this issue. Clinicians need to be aware of the facilitating or limiting impact of the environment on a patient's functioning to be able to adjust patient treatment accordingly and consequently to optimize patient-oriented care.

2 Zusammenfassung

Hintergrund

Die Hand ist das "Werkzeug der Werkzeuge" (Aristoteles). Es ist eines der wichtigsten Organe, welches den Menschen mit seiner Umwelt verbindet. Mit der menschlichen Hand hat die Natur uns mit einem höchst funktionellen und komplexen Instrument ausgestattet. Es gibt jedoch eine Reihe von Gesundheitsstörungen die Hand betreffend, welche deren vielfältige Nutzung einschränken. Gesundheitsstörungen der Hand lassen sich differenzieren in Erkrankungen oder Verletzungen welche ursächlich direkt an der Hand, dem Handgelenk oder dem Unterarm lokalisiert sind, wie beispielsweise Karpaltunnelsyndrom, Morbus Dupuytren oder Frakturen an der Hand. Des Weiteren kann die Hand durch Gesundheitsstörungen anderen Ursprungs limitiert sein, d.h. durch Erkrankungen oder Verletzungen welche ursächlich nicht an der Hand lokalisiert sind, diese aber in ihrer Funktion enorm beeinträchtigen können, wie zum Beispiel rheumatoide Arthritis, Schlaganfall, Multiple Sklerose, Morbus Parkinson oder Verletzungen des Plexus brachialis.

Alle Personen mit Gesundheitsstörung der Hand erfahren, unabhängig von der Art der Erkrankung oder Verletzung, substanzielle Herausforderung in ihrer alltäglichen Funktionsfähigkeit, die es zu bewältigen gilt. Da wir die Hand im Alltag vielfach einsetzen, kann eine verletzungs- oder erkrankungsbedingte Funktionseinschränkung der Hand erhebliche Auswirkungen auf die Unabhängigkeit einer Person, auf deren Arbeitsfähigkeit sowie auf das Vermögen die nötigen Alltagstätigkeiten zu bewältigen, nach sich ziehen. Dabei beziehen sich die von den Patienten erfahrenen Probleme nicht nur auf Körperfunktionen, (z.B. Beweglichkeit der Gelenke) oder auf Körperstrukturen (z.B. Knochen der Hand), sondern können auch seine Fähigkeit beeinträchtigen, Aktivitäten der täglichen Routine, wie beispielsweise häusliche Arbeiten, Selbstversorgung, berufliche Tätigkeiten oder Freizeitaktivitäten, erfolgreich durchzuführen. Während einige Probleme als Folge von Gesundheitsstörungen der Hand unter den Patienten weitverbreitet sind, so gibt es einzelne Probleme, deren Auftreten von

der jeweiligen Person, deren Kultur und sozialer Umwelt abhängen. Entscheidend ist es daher, ein tiefgreifendes Verständnis darüber zu entwickeln wie sich Erkrankungen und Verletzungen der Hand auf die Funktionsfähigkeit und Gesundheit der Patienten auswirken können, um so die Person als Ganzes, mit seinen individuellen Bedürfnissen, Lebensumständen und seiner Umwelt, in eine patientenorientierte Behandlung und qualitativ hochwertige Versorgung einzubinden. Demzufolge ist es für die klinische Forschung und Praxis wichtig zu wissen, welche Bereiche der funktionalen Gesundheit für Patienten mit Gesundheitsstörungen der Hand von Bedeutung sind. Momentan gibt es kein umfassendes Instrument oder Projekt, welches sich detailliert mit dieser Thematik auseinandersetzt.

Die Internationale Klassifikation der Funktionsfähigkeit, Behinderung und Gesundheit (ICF) gehört zu der von der Weltgesundheitsorganisation (WHO) entwickelten Familie der Klassifikationen, deren bekannteste Klassifikation die Internationale statistische Klassifikation der Krankheiten und verwandter Gesundheitsprobleme (ICD-10) ist. Im Zusammenhang der internationalen Klassifikationen der WHO, ergänzt die ICF die von der ICD-10 bereitgestellte Information über Diagnosen, Erkrankungen und Gesundheitsstörungen, indem sie Funktionsfähigkeit und Behinderung klassifiziert. Sie bietet einen konzeptionellen Rahmen und eine einheitliche und standardisierte Sprache um die Erfahrungen von Personen mit einer bestimmten Erkrankung umfassender zu beschreiben. Aus diesem Grund konnte die ICF als wertvolles Instrument eingesetzt werden, um über Funktionsfähigkeit von Personen mit Erkrankungen oder Verletzungen der Hand zu informieren.

Ziele

Übergreifendes Ziel meiner Dissertation ist es, unter Zuhilfenahme der ICF zu untersuchen, in welchen Bereichen der funktionalen Gesundheit sich der Einfluss von Gesundheitsstörungen der Hand auf die Funktionsfähigkeit und Gesundheit der betroffenen Personen, widerspiegelt. Die spezifischen Ziele sind 1) die Frage zu beantworten welche Aspekte von Funktionsfähigkeit und Gesundheit werden in der wissenschaftlichen Forschung zu Gesundheitsstörungen der Hand adressiert und 2) unser Wissen darüber zu erweitern, welche

Aspekte der Funktionsfähigkeit für Personen mit Gesundheitsstörungen der Hand am bedeutendsten sind und demzufolge in der klinischen Forschung und Praxis erfasst werden sollten. Um dieses Ziel zu erreichen, habe ich zunächst ein systematisches Literaturreview durchgeführt in dem ich die Inhalte der veröffentlichten Literatur zu Gesundheitsstörungen der Hand analysierte. Im Anschluss daran führte ich eine Studie durch, in der ich anhand statistischer Analysen die wichtigsten Aspekte der Funktionsfähigkeit identifizierte, welche am besten zwischen den verschiedenen Ebenen der allgemeinen Gesundheit der Patienten unterschieden.

Studie I: “Die funktionale Gesundheit in der wissenschaftlichen Forschung über Gesundheitsstörungen der Hand”

Ziel dieses Teils der Doktorarbeit ist es, die Frage zu beantworten, welche Aspekte von Funktionsfähigkeit und Gesundheit in der wissenschaftlichen Forschungsarbeit zu Gesundheitsstörungen der Hand adressiert werden. Die Antwort auf diese Frage wird ein tiefgreifendes Wissen darüber zur Verfügung stellen, wie Gesundheitsstörungen der Hand die Funktionsfähigkeit und Gesundheit von Personen mit Erkrankungen oder Verletzungen der Hand beeinflussen und wird darüber hinaus potenzielle Lücken in der wissenschaftlichen Literatur aufzeigen.

Zu diesem Zweck wurde ein systematisches Literaturreview veröffentlichter Studien über Personen mit verschiedenen Gesundheitsstörungen der Hand durchgeführt. Dabei wurden die Inhalte der ermittelten Studien auf Basis der bio-psycho-sozialen Sichtweise von Funktionsfähigkeit und Gesundheit, wie sie die ICF bereitstellt, analysiert. Eine Literatursuche wurde in den elektronischen Datenbanken MEDLINE, Embase, PsycINFO, CINAHL und PEDro durchgeführt, um zwischen 1998 und 2008 veröffentlichte Artikel zu identifizieren. Die Internationale Klassifikation der Funktionsfähigkeit, Behinderung und Gesundheit (ICF) wurde genutzt, um die aus den eingeschlossenen Studien gewonnene Information zu identifizieren, zu gruppieren und zu quantifizieren.

Insgesamt wurden 302 Studien über Gesundheitsstörungen der Hand in die Untersuchung eingeschlossen. Die inhaltliche Analyse der ausgewählten

Studien ergab, dass 152 verschiedene Aspekte von Funktionsfähigkeit in der veröffentlichten Literatur adressiert wurden. Es konnte gezeigt werden, dass vor allem in der ICF Komponente Aktivitäten und Partizipation [Teilhabe] eine große Bandbreite an Funktionsaspekten eine zufriedenstellende Berücksichtigung in der Literatur fand. Es zeigte sich jedoch weiter, dass in der wissenschaftlichen Forschung zu Gesundheitsstörungen der Hand, Handlungsbedarf hinsichtlich der Erfassung mentaler Funktionen wie zum Beispiel 'Emotionaler Funktionen' sowie von Mobilitätsaspekten, wie beispielsweise 'Transportmittel benutzen' besteht. Insbesondere in Studien über Erkrankungen oder Verletzungen, welche direkt an der Hand lokalisiert sind, werden außerdem wichtige Aspekte der Selbstversorgung (z.B. 'Seine Körperteile pflegen', 'Die Toilette benutzen') sowie Aspekte des häusliche Lebens (z.B. 'Waren und Dienstleistungen des täglichen Bedarfs beschaffen') übersehen. Des Weiteren zeigen die Ergebnisse der Untersuchung, dass der Einfluss von Umweltfaktoren auf den Gesundheitszustand der Patienten eine breitere Beachtung in der Forschungsarbeit finden sollte, um unsere Erkenntnisse über die Bedürfnisse der Patienten zu steigern und um eine patientenorientierte Gesundheitsversorgung zu verbessern. Durch die in diesem systematischen Review angewendete Methode, konnte ferner eine Übersicht über die am häufigsten verwendeten standardisierten Erhebungsinstrumente und klinischen Meßinstrumente erstellt werden.

Studie II: "Aspekte von Funktionsfähigkeit, die den allgemeinen Gesundheitszustand des Patienten erklären"

Das übergreifende Ziel dieses Teils der Doktorarbeit ist es, unser Wissen darüber zu erweitern, welche Aspekte der Funktionsfähigkeit für Personen mit Gesundheitsstörungen der Hand am bedeutendsten sind und demzufolge in der klinischen Forschung und Praxis erfasst werden sollten. Erstes spezifisches Ziel ist es, die ICF-Kategorien zu identifizieren welche am meisten dazu beitragen die Unterschiede in der allgemeinen Gesundheit von Patienten zu erklären. Das zweite spezifische Ziel ist es, zu prüfen ob sich eine rein statistische Auswahl von einer expertenbasierten Auswahl unterscheidet.

Eine multizentrische Querschnittstudie wurde durchgeführt, welche Patienten mit verschiedenartigen Gesundheitsstörungen der Hand aus

Traumazentren und Rehabilitationseinrichtungen in Deutschland einschloss. Gesundheitsfachpersonen führten Interviews anhand der ICF durch, um den Einfluss von Verletzungen oder Erkrankungen der Hand auf die Gesundheit der Patienten zu untersuchen. Außerdem beurteilten sowohl Patienten als auch betreuenden Gesundheitsfachpersonen den aktuellen allgemeinen Gesundheitszustand der Befragten.

Multivariable Regressionsanalysen wurden in mehreren Stufen angewendet, um die Gruppe von ICF-Kategorien auszuwählen, welche die Unterschiede im allgemeinen Gesundheitszustand der Patienten am besten erklären. Die mit der statistischen Methode identifizierten Aspekte der Funktionsfähigkeit und Umweltfaktoren wurden mit einer expertenbasierten Auswahl an ICF-Kategorien verglichen.

Die Gruppe von 33 statistisch identifizierten ICF-Kategorien umfasst sämtliche Komponenten der Funktionsfähigkeit (d.h. Körperfunktionen, Körperstrukturen sowie Aktivitäten und Partizipation [Teilhabe]) und zudem eine große Bandbreite an Umweltfaktoren. Mit den Ergebnissen dieser Untersuchung konnte gezeigt werden, dass sich über die Hälfte einer expertenbasierten Auswahl an ICF-Kategorien mit der rein statistischen Auswahl deckt.

Schlussfolgerung

Diese Doktorarbeit zeigt, dass Funktionsfähigkeit ein zentraler Aspekt in der Erfahrung von Personen mit Erkrankungen oder Verletzungen der Hand ist. Erkrankungen oder Verletzungen der Hand beeinflussen die Funktionsfähigkeit und Gesundheit der Patienten in umfassender Weise und trotz ihres häufigen Auftretens werden ihre Folgen in der klinischen Praxis dennoch vielfach unterschätzt. Für Kliniker liegt der Fokus typischerweise auf die Beeinträchtigungen in den Körperfunktionen und Körperstrukturen, wohingegen beispielsweise psychologische Aspekte, Alltagssituationen und die Umwelt einer Person übersehen werden. Mit den Ergebnissen dieser Doktorarbeit konnte aufgezeigt werden, dass mentale Funktionen in der wissenschaftlichen Forschung zu Gesundheitsstörungen der Hand bislang weitgehend unberücksichtigt wurden. Zugleich hat sich allerdings gezeigt, dass mentale Funktionen, wie zum Beispiel

emotionale Funktionen oder Funktionen des Schlafes, einen wichtigen Beitrag zur allgemeinen Gesundheit einer Person leisten. Die Folgen von Erkrankungen oder Verletzungen der Hand auf die Funktionsfähigkeit und Gesundheit einer Person sind komplex daher ist es entscheidend mentale Funktionen einzubeziehen, um ein weitreichenderes Verständnis der Patientenbedürfnisse zu erlangen. Diese Arbeit stellt zudem heraus, dass die physische, soziale und einstellungsbezogene Umwelt eines Patienten in der klinischen Forschung einer systematischeren Berücksichtigung bedarf. Die wissenschaftliche Literatur zu Gesundheitsstörungen der Hand zeigt beträchtliche Lücken hinsichtlich der Erfassung dieses Aspektes. Kliniker sollten sich über die förderlichen oder hinderlichen Einflüsse der Umwelt auf die Funktionsfähigkeit der Patienten bewusst sein, um die Behandlung der Patienten entsprechend ausrichten zu können und als Folge dessen eine optimierte patientenorientierte Versorgung leisten zu können.

3 Background

3.1 Hand conditions and functioning

The hand is the “tool of the tools” (Aristotle). It is one of the most relevant organs connecting human beings to their environment. With the human hand nature has provided us with a highly functional and complex instrument. However, various types of conditions and injuries affect the hand and limit its multitude utilization. One can differentiate the types of hand conditions in conditions of the hand, considered as disorders, diseases or injuries located directly at the hand, such as carpal tunnel syndrome (CTS), Dupuytren's disease or fractures of the hand. Furthermore, the hand can be limited due to conditions involving the hand considered as disorders or diseases as well as injuries not localized or originating in the hand but affecting the hand, such as rheumatoid arthritis, stroke, multiple sclerosis, Parkinson's disease or brachial plexus injuries.

Epidemiological data taking into account all hand conditions together are lacking. Prevalence and incidence information is available for specific diseases such as tendonitis, digital amputation, tendon ruptures and tears (prevalence 1.6 % to 53.0 %) [1], Dupuytren's disease (prevalence 0.2 % to 56.0 %) [2], CTS (prevalence 0.2 % to 56.0 %) [3], hand osteoarthritis (prevalence 2.2 % to >80 %) [4-7] rheumatoid arthritis (prevalence 0.2 % to 1.1 %) [8,9], Parkinson's disease (age adjusted annual incidence rates 9.03 to 21.5) [10-14] or multiple sclerosis (prevalence 0.01 % to 1.7 %) [15-18].

In Germany, hand injuries make up the most frequent work related injuries. The German Social Accident Insurance (Deutsche Gesetzliche Unfallversicherung, DGUV) stated in 2009 that more than one third of work accidents result in injuries of the hand [19]. Similar data from the Victorian Injury Surveillance project in Australia showed that wrist and hand injuries account for 42% of work injury admissions [20]. Consequently hand injuries result in a high

socioeconomic burden, whereas not only the direct treatment costs (e.g., for operations, hospitalization or rehabilitation) but the indirect costs as well (e.g., for accident compensation, loss productivity or sickness benefits) are accountable for the high expenditure after hand injuries [21,22]. Even minor injuries of the hand account for considerable expenses to health care systems and can affect in a tremendous way a person's quality of life [21,23]. In addition, the healing process of hand conditions often takes a long period of time accompanied with the risk of an irreversible function deficit [23].

Since the hand serves us in numerous daily activities, a function deficit in the hand can have significant impact on independence, employability [24,25] and the ability to perform all required tasks in day-to-day life [26,27]. All individuals with hand conditions, irrespective of the type of hand condition, have to cope with substantial challenges in daily functioning. The problems patients experience are not only related to functions of body systems (e.g. mobility of joints) or to body structures (e.g. bones of hand), but may also affect a person's ability to successfully carry out daily routine in domestic life, self-care, work and leisure activities [28-31]. As the spectrum of impairments related to hand conditions can be quite different from patient to patient, an in-depth understanding and knowledge of the manifold impact of hand conditions on health and health-related domains is essential for a patient-oriented care. Only interdisciplinary teams consisting of physicians, occupational therapists, physical therapists, psychologists as well as nurses and social workers, supplied with a specialized knowledge in treatment and consequences of hand conditions, can ensure high quality care [23].

Extensive scientific research has been carried out to explore the impact of hand conditions and to increase knowledge on its treatment [22,32-37]. The information thereby provided forms the scientific basis to guide health professionals in their clinical practice and to expand their understanding on patients' needs. Thus, it is crucial that research activities capture the entire spectrum of functioning potentially relevant to patients with hand conditions. As functioning constitutes a complex and dynamic interaction between a health condition and contextual personal factors and environmental factors [38], the amount of disability also depends on the circumstances in which a patient lives or

actually is situated and also on the activities someone needs or wants to perform. Clinicians therefore also need to be aware of the different impacts of environmental factors when planning patient's care.

For an in-depth understanding of functioning in hand conditions, research activities need to be reviewed regarding the areas of functioning they capture. Further, to be able to distinguish in clinical research between the different levels of health after experiencing a hand injury or hand condition, it is important to consider which functioning aspects best explain patients' self-perceived general health. This can provide us with a first overview of how hand conditions impact on a patient's functioning and health.

The International Classification of Functioning, Disability and Health (ICF) was adopted 2001 by the World Health Organization (WHO) as an etiologically neutral classification [38] providing the complete spectrum of functioning domains as well as relevant environmental factors. It can serve as a valuable tool to perform structured content evaluation of published studies [39].

3.2 The International Classification on Functioning, Disability and Health (ICF)

The ICF is one of the World Health Organisation's (WHO) family of international classifications of which the best known is the International Statistical Classification of Diseases and Related Health Problems (ICD) [38]. In this context of the WHO international classifications, the ICF complements the information on diagnosis, diseases, disorders and other health conditions provided by the ICD by classifying information on functioning and disability. Thus, ICD and ICF are complementary classifications from which WHO envision a common application in clinical medicine and research.

The ICF provides a comprehensive conceptual framework and a unified standardized language to describe health and health-related states, both at the individual, as well as at population levels. It contains an exhaustive list of globally acceptable descriptions, usable to inform about functioning, disability and health in

individuals with a specific disorder. Thus, the ICF is typically referred to as the unified and standard language of human functioning, disability and health and establish the basis for a more comprehensive description of the experience of patients suffering from a determined disease. Based on the biopsychosocial view of functioning, disability and health, the classification comprises the components Body Functions, Body Structures, in addition to Activities and Participation. In the ICF, functioning and disability are understood as an interaction with the environment and the characteristics of the person. Therefore, contextual personal and environmental factors are also included in the ICF approach [38].

The ICF contains more than 1400 disjunctive alphanumeric categories. The letters b, s, d and e refer to the components Body Functions (b), Body Structures (s), Activities and Participation (d) and Environmental Factors (e). They are followed by a numeric code starting with the chapter number (one digit), followed by the second level (two digits), and the third and fourth levels (one digit each). The ICF categories are hierarchically organized, whereas chapters make up the first level of the hierarchy. Each chapter consists of second-level categories and, in turn, these encompass third- and fourth-level categories. More specific third- or fourth-level categories in the ICF share the attributes of less specific second-level categories, however, in a more precise frame of reference to find information in the ICF [38]. Figure 1 illustrates the structure of the ICF and shows that the contextual personal factors have not been classified yet.

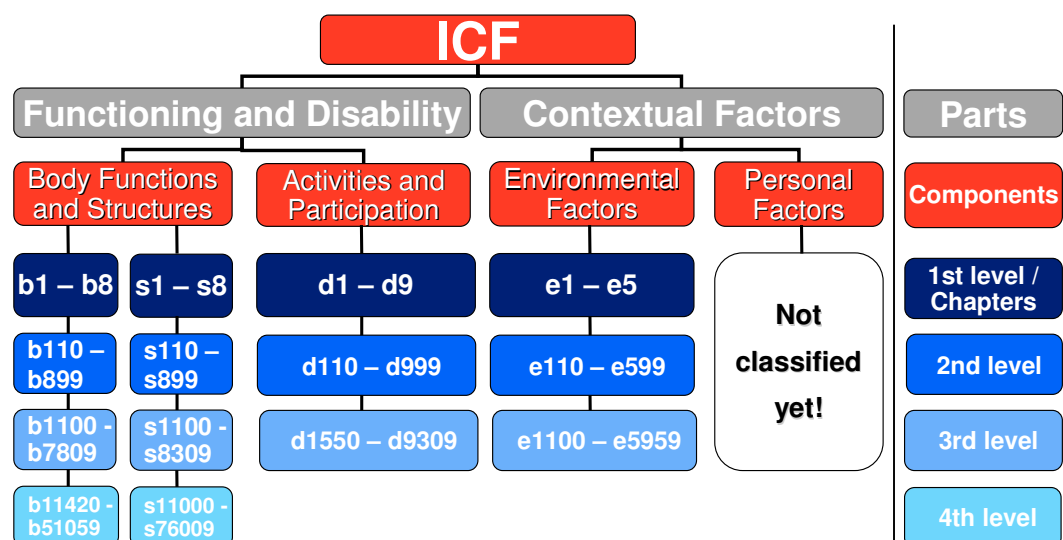


Figure 1. The structure of the ICF with its components and levels of hierarchy.

An example for the hierarchically organization of the classification from the Body Structures component is presented in Table 1.

ICF code	Title	ICF level
s7	Structures related to movement	(1 st level / ICF chapter)
s730	Structure of upper extremity	(2 nd level)
s7302	Structure of hand	(3 rd level)
s73020	Bones of hand	(4 th level)
s73021	Joints of hand and fingers	(4 th level)
s73022	Muscles of hand	(4 th level)
s73023	Ligaments and fasciae of hand	(4 th level)
s73028	Structure of the hand, other specified	(4 th level)

Table 1. Hierarchical organization of the ICF with further specification in the higher levels.

The ICF categories should not be misinterpreted as items but should be considered as agreed-on descriptions of “what” might be relevant to individuals with a health disorder. There is a wide range of items potentially suitable for the measurement of a specific ICF category or a set of ICF categories [40]. For example, there is a large number of items suitable to operationalize the ICF category ‘d430 – Lifting and carrying objects’, for example, “Carry a 10lb object in my affected hand” from the Patient Rated Wrist Evaluation (PRWE) [41], “picking up large light objects” from the Jebsen Taylor Hand Function Test (JHFT) [42] and “Lift 5 pounds over head” from the Capabilities of Upper Extremity Instrument (CUE) [43].

Whereas the number of ICF categories necessary to describe functioning, disability and health is finite, a various number of items potentially useful to measure those categories might exist [44]. It has to be distinguished that the ICF categories are needed when specifying “what to measure” while items and clinical assessments such as imaging, laboratory tests or physical examinations, as well as standardized performance tests, are needed when specifying “how to measure”.

In summary, the ICF classification system with its ICF categories provides a composition of the whole spectrum of meaningful units necessary to describe the experience of people regarding functioning, disability and health. With the ICF, clinicians can rely on a classification to report the problems associated with the health conditions treated in clinical practice. Nearly all areas of an individual's functioning can be assigned to and described by one or more of the categories provided by the very comprehensive classification system. The usefulness and the advantages of the ICF have widely been reported [45-48]. However, it has been recognized that in everyday clinical practice only a fraction out of the total number of ICF categories is needed [49]. Thus, to enhance the applicability of the ICF, practical tools called "ICF Core Sets" have been developed [50].

3.3 The ICF Core Sets for Hand Conditions

ICF Core Sets are list of ICF categories to describe functioning and disability of patients with a specific health condition [50] and intend to present a wide, condition-specific spectrum that may reflect the whole health experience of patients.

The ICF Core Sets for Hand Conditions have been adopted at the International ICF Consensus Conference convened in Switzerland in May 2009 [57]. Twenty-three experts in the field of hand conditions with diverse professional background (physicians, physiotherapists, occupational therapists, nurses, psychologists, and social workers) from 22 different countries were involved in the formal decision-making and consensus process. In contrast to other ICF Core Sets already developed [50], the ICF Core Sets for Hand Conditions do not focus on a determined health condition, but refer to the part "hand". All different hand conditions therefore had to be taken into account. That is, conditions of the hand, considered as disorders, diseases or injuries located directly at the hand, such as such as CTS, Dupuytren's disease or fractures of the hand, as well as disorders, diseases or injuries not localized or originating in the hand but affecting the hand (e.g. Parkinson's disease, stroke, brachial plexus injuries etc.).

The ICF Core Sets for Hand Conditions represent a selection of categories taken from the entire classification, which are relevant in various diseases, disorders or injuries related to the body part “hand”. Two different types of ICF Core Sets have been developed: the Comprehensive ICF Core Set for Hand Conditions and the Brief ICF Core Set for Hand Conditions (see Appendix 1). The Comprehensive ICF Core Set provides a list of ICF categories relevant to describe functioning and disability of individuals with hand conditions in a comprehensive, multidisciplinary assessment. The Brief ICF Core Set list a selection of ICF categories, taken from the Comprehensive ICF Core Set, that serves as the minimal international standard to report about a patient’s functioning. It should be taken into account in any patient, irrespective of the type of hand condition and the health care setting in which they are treated, along the continuum of care (ranging from the acute hospital to rehabilitation facilities and community) and across sectors (health, education, labour and social affairs), independently of the status of disease.

Given that an extensive amount of outcome measures exists to be used in clinical studies and evaluation on patients with hand conditions, without consensus on which are the most appropriate outcome measures [51-54], the ICF Core Sets for Hand Conditions can serve in guiding clinicians and researchers regarding the assessment and reporting of functioning and disability in clinical studies, clinical encounters, and multi-professional health care.

Yet, it is important to note that the ICF Core Sets for Hand Conditions are not a health status measure in their own right. In principle, they are agreed-on lists of functioning aspects (i.e. ICF categories) important in different types of health disorders related to the hand. In a clinical setting, they should be seen in addition to established tools such as validated patient questionnaires (e.g. the DASH questionnaire) [55], clinical assessments, and standardized performance tests. The ICF Core Sets for Hand Conditions provide an international standard of what to measure and to report in hand conditions and aim to facilitate the interpretation and aggregation of data for health information [50,56].

4 Research objectives

The overall objective of my doctoral thesis is to explore, what are the areas of functioning that represent the impact of hand conditions on individuals' functioning and health, using the ICF as operational basis.

The specific aims are 1) to answer the question what are the areas of functioning and health addressed in the scientific research on hand conditions and 2) to contribute to our knowledge, what are the most essential areas of functioning in individuals with hand conditions that should be addressed in clinical research and practice.

Therefore, this doctoral thesis is subdivided into two parts. In the first part, I performed a systematic literature review and analysed the content of published literature on hand conditions to study the areas of functioning and health addressed in the scientific research on hand conditions. In the second part, I performed a study in which, based on statistical analyses, I identified the most essential areas of functioning that best differentiate among the patients' different level of general health.

5 Study I: Functioning in scientific research on hand conditions

5.1 Objective

The objective of this part of the doctoral thesis is to answer the question what are the areas of functioning and health addressed in the scientific research on hand conditions. The answer to this question will provide a profound knowledge about how hand conditions impact on functioning and health in individuals with hand conditions and will highlight potential gaps in the literature.

5.2 Methods

5.2.1 Study design

A systematic review was performed using a selection procedure following three steps: Step 1, selection of studies, Step 2, data extraction, and Step 3, linking of the concepts contained in the outcome measures to the corresponding categories of the ICF.

Step 1: Selection of studies. The electronic literature databases MEDLINE, Embase, PsycINFO, CINAHL, and PEDro were searched for articles in English language published between 1998 and 2008. The search strategy comprised search terms referring to 1) anatomic structures (e.g. 'ulna') / parts of the hand (e.g. 'finger'), combined with the Boolean 'OR'; 2) injuries / diseases (e.g. 'fracture'), combined with the Boolean 'OR'; 3) interventions (e.g. 'surgery'), combined with the Boolean 'OR' and also MeSH terms (e.g. 'hand injuries') related to the hand. The Boolean 'AND' operator, as well as adjacency operators were used to limit the search (see Appendix 2).

Eligibility criteria regarding the inclusion and exclusion of the studies were preliminary defined. A screen applying the inclusion criteria was performed on the

retrieved abstracts. Studies were included if that 1) reported firsthand data of patients either with conditions (e.g. Dupuytren's disease) or injuries located at the hand, wrist or forearm or patients with conditions not localized or originating in the hand but affecting the hand (e.g. stroke), 2) reported a sample size ≥ 10 and 3) included individuals aged ≥ 18 . Randomized and clinical controlled trials, observational studies (cross-sectional or longitudinal), qualitative studies and chart reviews were included. Studies including non-human population (animal study/ cadaver study/ exclusively laboratory-parameters/ in-vitro study) were excluded, as well as studies having less than 10 individuals with hand condition in the study sample. Studies were also excluded if the target population remained unclear. Reviews, overviews, meta-analyses, and psychometric studies were excluded, as well as comments, letters, editorials, guidelines, conference reports, book chapters and dissertations. A final decision on the included or excluded articles was made when the full-text was accessed and reviewed.

Step 2: Data extraction. All outcome measures reported in the included studies were extracted. Outcome measures were categorized as follows: a) standardized patient-reported measures, in which patients respond to a number of standardized questions asked in a paper and pencil form or in an interview; b) standardized health professional reported measures in which the health professionals report the patient's performance, behaviour or status according to a number of standardized items or operational criteria; c) standardized performance tests of patients performed tasks; and d) clinical assessments which comprise technical measures (e.g. laboratory, imaging, electro-physiologic examinations), as well as physical examinations (e.g. goniometry, hand dynamometry). All further reported outcomes such as 'nerve growth' were additionally extracted, as well as sample size, gender, socio-demographic parameters, besides diagnosis and intervention type.

Step 3: Linking to the ICF. The concepts addressed in the single items of the patient-reported and the health professional reported outcome measures were determined. A concept is defined as a specific component of text, consisting either of a few words or a few sentences with a common motif [58]. These concepts were then linked to the ICF based on established linking rules [59]. Additionally, the aim

of every single task in a certain standardized performance test was determined and linked to the ICF, as well as the aim of each clinical assessment, for which it was assessed. All further reported outcomes were also linked to the ICF. During the whole linking process, the researchers were advised to link the content of the outcome measures to the ICF category representing it most precisely.

Two researchers independently decided which ICF category should be linked. In case of disagreement, the arguments were discussed and if necessary, a third researcher was involved to reach consensus and to decide on the final category. The application of the predefined linking rules has been shown to yield high overall agreement between raters (91% at the second-level of the classification) [60]. If the information was too general to allow a decision to a specific ICF category, it was considered as 'not defined' (nd) (e.g. 'swelling'). If the information described an aspect not represented by the ICF, the option 'not covered' (nc) was chosen. For instance, 'sensory nerve action potentials' or 'time from injury to surgery' were considered not to be covered by the ICF. In case the information referred to personal factors, 'pf' ('personal factor') was attributed.

5.2.2 Analyses

Descriptive statistics were used to report the most frequently used outcome measures. The frequency of studies addressing a determined ICF category was calculated to describe the aspects of functioning found. If an ICF category was addressed more than once in the same study, that ICF category was counted only once. Therefore, the maximum number does not exceed the number of identified studies. The results are presented by type of hand condition, differentiated in condition or injury of the hand (such as CTS), condition or injury affecting the hand (such as stroke or multiple sclerosis). The Difference between the percentages was calculated to indicate the ICF categories in which the types of hand conditions differ mostly.

For the sake of clarity, the total frequency of ICF categories is presented on the second level of the classification. The third- or fourth-level ICF categories have common attributes with their overlying second-level category (see Table 1).

Thus, in case a third- or fourth-level ICF category was used in the linking process, its referring second-level category was reported.

ICF categories with a frequency equal or greater than 5% in studies on conditions of the hand or in studies on conditions involving the hand are shown.

5.3 Results

In step 1, the searches in all five electronic literature databases identified 18861 citations in total. Out of these, a computer-generated random sample of 2782 studies was checked on inclusion based on the preliminary defined eligibility criteria. Abstract review led to the retrieval of 471 full-text articles, of which 302 studies were finally included (see Appendix 3). These studies included a total study sample of 16,707 participants, with study size ranging from 10 to 985. The total sample across studies comprised 8,212 (61%) women (36 studies did not provide information on gender). Mean age ranged from 23.8 to 82.0.

From all included studies, 188 studies involved patients with conditions of the hand; 114 studies included patients with health conditions involving the hand. The most frequently reported conditions of the hand were fractures of forearm (18.2%), CTS (6.3%), fractures at wrist and hand level (5.0%), primary and post-traumatic arthrosis of joints at forearm wrist and hand level (5.0%), arthrosis of first carpometacarpal joint (3.6%) and Algoneurodystrophy (3.3%). Among the health conditions involving the hand, stroke (20.9%), rheumatoid arthritis (6.0%), paraplegia and tetraplegia (2.6%), and systemic sclerosis (2.0%) occurred most frequently. Table 2 shows the most common main diagnoses included in all 302 studies on hand conditions, whereas only diagnoses with a frequency ≥ 3 are presented.

One hundred thirty-eight of the studies were observational studies (45.7%). The remaining 164 studies (54.3%) were intervention studies conducted in patients with hand conditions in the framework of randomized clinical trials, controlled clinical trials or other types of studies. From these 72 (43.9%) reported surgical interventions and 92 (56.1%) reported conservative and/or rehabilitative interventions.

Diagnosis	Frequency of diagnosis (N=302)	Total number of studies
	n	%
Conditions involving the hand (n=114)		
Stroke	63	20.9
Rheumatoid arthritis	18	6.0
Paraplegia and tetraplegia	8	2.6
Systemic sclerosis	6	2.0
Intracranial injury	4	1.3
Parkinson's disease	3	1.0
Conditions of the hand (n=188)		
Fracture of forearm	55	18.2
Carpal tunnel syndrome	19	6.3
Fracture at wrist and hand level	15	5.0
Primary and post-traumatic arthrosis of joints at forearm, wrist and hand	15	5.0
Arthrosis of first carpometacarpal joint	11	3.6
Algoneurodystrophy	10	3.3
Dislocation, sprain and strain of joints and ligaments at wrist and hand	6	2.0
Other and unspecified injuries of wrist and hand	6	2.0
Burn and corrosion of wrist and hand	5	1.7
Open wound of wrist and hand	4	1.3
Injury of nerves at wrist and hand level	4	1.3

Table 2. Main diagnoses in 302 studies on hand conditions.

The studies were originated from different countries: 90 from the United States of America, 28 from the United Kingdom, 20 from Germany, 17 from Australia, 15 from Japan and The Netherlands each, 13 from Sweden, 11 from Turkey, 10 from Canada, 8 from Italy, and 6 from Spain and Taiwan each. From all other countries, five or less studies were analyzed. In Figure 3 the data are presented according to the official WHO world regions.

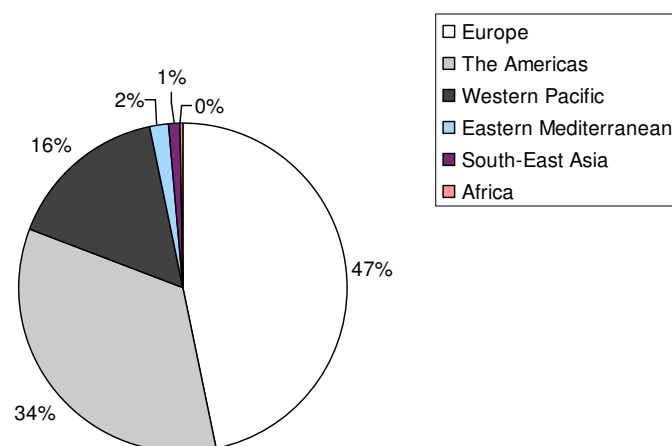


Figure 2. Studies on hand conditions by WHO world region.

In step 2, 141 different standardized outcome measures were identified: 58 standardized patient-reported measures, 38 standardized performance tests and 45 health professional reported measures. The clinical assessments recorded from the included studies most frequently aimed to assess: range of motion or mobility in joints of hand and fingers, pain, and pinch or grip strength, which were addressed in 134 (44.4%), 116 (38.4%) and 112 (37.1%) of the studies, respectively. In addition, 2687 further outcomes such as ‘nerve growth’, ‘thenar atrophy’, ‘prosthesis stability’, ‘tenderness’ or ‘existence of blisters’ were extracted. Table 3 presents the frequency of the standardized patient-reported measures and standardized performance tests.

Outcome measures	Conditions of the hand (N=188)	Conditions involving the hand (N=114)	Total number of studies (N=302)	
	n	n	n	%
Patient reported measures				
Disabilities of the Arm, Shoulder, and Hand Questionnaire	22	1	23	7.6
MOS Short Form 36 / Short Form 12 health survey	10	1	11	3.6
Health Assessment Questionnaire	0	10	10	3.3
Boston Carpal Tunnel Syndrome Questionnaire	10	0	10	3.3
Functional Independence Measure	0	7	7	2.3
Patient-Rated Wrist Evaluation	4	1	5	1.7
Michigan Hand Questionnaire	1	2	3	1.0
Performance tests				
Jebson Taylor Hand Function Test	7	11	18	6.0
Box and Block Test	0	11	11	3.6
Action Research Arm Test	0	10	10	3.3
Wolf Motor Function Test	0	6	6	2.0
Nine Hole Peg Test	1	4	5	1.7
Purdue Pegboard Test	1	3	4	1.3
Drawing Test	1	2	3	1.0
Arthritis Hand Function Test	0	3	3	1.0
Upper Extremity Function Test	0	3	3	1.0

Table 3. Frequency of the standardized patient-reported measures and standardized performance tests based on type of hand condition (only those with a frequency ≥ 3 are presented).

Table 4 shows the most frequently applied health professional reported measures and clinical assessments, stratified for type of hand conditions.

Outcome measures	Conditions of the hand (N=188)	Conditions involving the hand (N=114)	Total number of studies (N=302)	
	n	n	n	%
Health professional reported measures				
Ashworth Scale	0	26	26	8.6
Gartland and Werley Score	16	0	16	5.3
Fugl-Meyer Assessment of Motor Recovery After Stroke	0	16	16	5.3
Barthel Index	0	9	9	3.0
Mini-Mental State Examination	0	9	9	3.0
MAYO Wrist Score	8	0	8	2.6
Motor Activity Log	0	8	8	2.6
Motor Assessment Scale	0	7	7	2.3
Medical Research Council Scale	0	5	5	1.7
Edinburgh Handedness Inventory	1	4	5	1.7
Rivermead Motor Assessment	0	4	4	1.3
Motoricity Index	0	4	4	1.3
Chedoke-McMaster Stroke Assessment Scale	0	3	3	1.0
Rankin Scale For Stroke Disability	0	3	3	1.0
Motor Status Scale	0	3	3	1.0
Unified Parkinson's Disease Rating Scale	0	3	3	1.0
Clinical assessments				
Goniometric assessment or physical examination (Range of motion / mobility in joints of hand and fingers)	92	42	134	44.4
Hand dynamometers (Pinch and/or grip strength)	90	36	116	38.4
Visual Analogue Scale (Pain)	88	24	112	37.1
Medical imaging technique (Bone position, fracture displacement, carpal changes)	61	7	68	22.5
Neurological examination, Two-Point-Discrimination, Tinel's sign, Phalen's test, Semmes Weinstein Monofilament Test (Nerve damage, nerve function, sensory assessment)	38	5	43	14.2
Functional magnetic resonance imaging, finger tapping (Hand/finger movement performance, motor control)	6	25	31	10.3

Table 4. Frequency of health professional reported measures and clinical assessments based on type of hand condition.

In Step 3, the information retrieved from the studies contained in total 10,254 concepts. Thereof, 8,475 (82.7%) assignable concepts were linked to 152 different second-level categories of the ICF. The concepts distributed to the ICF components as follows: 3,245 (38.3%) were linked to the component Body

Functions, 1,110 (13.1%) to the component Body Structures, 3,233 (38.1%) to the component Activities and Participation and 887 (10.5%) to the component Environmental Factors.

The code 'not covered' (nc) was used 324 (3.2%) times and the code 'not defined' (nd) 453 (4.3%) times. Outcomes addressed 414 (4.0%) times a 'health condition' (hc) and 353 (3.4%) times a 'personal factor' (pf). ICF chapters were linked 235 (2.3%) times because the information to be linked was too broad for a more specific ICF category.

Of the 152 different second-level ICF categories addressed in the included studies on hand conditions, 49 categories reached a frequency of at least 10 percent, either in studies on conditions of the hand or in studies on conditions involving the hand: 13 Body Functions, 4 Body Structures, 29 Activities and Participation and 3 Environmental Factors. The most frequently identified categories among all included studies were in Body Functions and Body Structures: 'b710 Mobility of joint functions', 'b730 Muscle power functions', 'b280 Sensation of pain' and 's730 Structure of upper extremity'. Table 5 shows the frequency of second-level ICF categories from the components Body Functions and Body Structures, which were identified in equal or more than five percent of total studies on hand conditions, stratified for type of hand conditions.

Among Activities and Participation, 'd440 Fine hand use', 'd445 Hand and arm use' and 'd540 Dressing' showed the highest frequencies. The categories 'e580 Health services, systems and policies' and 'e115 Products and technology for personal use in daily living' were the most frequent Environmental Factors.

The analyses further revealed that most of the ICF categories, showing high differences between the two types of hand conditions, are related to 'd4 Mobility', 'd5 Self care' or 'b7 Neuromuskuloskeletale and movement related functions'.

ICF Code	Title	Conditions of the hand (N=188)		Conditions involving the hand (N=114)		Difference in conditions Δ %	Total number of studies (N=302)	
		n	%	n	%		n	%
Body Functions								
b114	Orientation functions	2	1.1	17	14.9	13.8	19	6.3
b126	Temperament and personality functions	29	15.4	7	6.1	9.3	36	11.9
b130	Energy and drive functions	16	8.5	10	8.8	0.3	26	8.6
b134	Sleep functions	16	8.5	9	7.9	0.6	25	8.3
b140	Attention functions	5	2.7	15	13.2	10.5	20	6.6
b144	Memory functions	3	1.6	14	12.3	10.7	17	5.6
b152	Emotional functions	20	10.6	19	16.7	6.1	39	12.9
b167	Mental functions of language	0	0.0	17	14.9	14.9	17	5.6
b265	Touch function	58	30.9	19	16.7	14.2	77	25.5
b270	Sensory functions related to temperature and other stimuli	62	33.0	21	18.4	14.6	83	27.5
b280	Sensation of pain	131	69.7	42	36.8	32.9	173	57.3
b435	Immunological system functions	36	19.1	9	7.9	11.2	45	14.9
b525	Defecation functions	2	1.1	17	14.9	13.8	19	6.3
b620	Urination functions	1	0.5	16	14.0	13.5	17	5.6
b710	Mobility of joint functions	124	66.0	80	70.2	4.2	204	67.5
b715	Stability of joint functions	59	31.4	25	21.9	9.5	84	27.8
b730	Muscle power functions	112	59.6	79	69.3	9.7	191	63.2
b735	Muscle tone functions	3	1.6	41	36.0	34.4	44	14.6
b750	Motor reflex functions	0	0.0	16	14.0	14.0	16	5.3
b760	Control of voluntary movement functions	3	1.6	43	37.7	36.1	46	15.2
b765	Involuntary movement functions	2	1.1	19	16.7	15.6	21	7.0
b820	Repair functions of the skin	15	8.0	1	0.9	7.1	16	5.3
b840	Sensation related to the skin	35	18.6	1	0.9	17.7	36	11.9
Body Structures								
s120	Spinal cord and related structures	46	24.5	1	0.9	23.6	47	15.6
s410	Structure of cardiovascular system	13	6.9	2	1.8	5.1	15	5.0
s720	Structure of shoulder region	22	11.7	18	15.8	4.1	40	13.2
s730	Structure of upper extremity	128	68.1	44	38.6	29.5	172	57.0
s810	Structure of areas of skin	20	10.6	9	7.9	2.7	29	9.6

Table 5. Frequency of 2nd-level ICF categories from the components Body Functions and Structures, considered in $\geq 5\%$ of 302 studies, by type of hand condition. ICF categories addressed in $\geq 25\%$ of the total number of studies are printed in bold ($n=7$).

In Table 6, the second-level ICF categories from the components Activities and Participation as well as from the Environmental Factors along with their frequencies are listed. Only ICF categories having a prevalence of ≥ 5 percent in total studies on conditions of the hand and conditions involving the hand are shown.

ICF Code	Title	Conditions of the hand (N=188)		Conditions involving the hand (N=114)		Difference in conditions		Total number of studies (N=302)	
		n	%	n	%	Δ	%	n	%
Activities and Participation									
d170	Writing	37	19.7	28	24.6	4.9		65	21.5
d230	Carrying out daily routine	29	15.4	3	2.6	12.8		32	10.6
d360	Using communication devices and techniques	4	2.1	15	13.2	11.1		19	6.3
d410	Changing basic body position	10	5.3	44	38.6	33.3		54	17.9
d415	Maintaining a body position	1	0.5	29	25.4	24.9		30	9.9
d420	Transferring oneself	4	2.1	27	23.7	21.6		31	10.3
d430	Lifting and carrying objects	49	26.1	43	37.7	11.6		92	30.5
d440	Fine hand use	55	29.3	81	71.1	41.8		136	45.0
d445	Hand and arm use	52	27.7	66	57.9	30.2		118	39.1
d450	Walking	10	5.3	44	38.6	33.3		54	17.9
d455	Moving around	10	5.3	37	32.5	27.2		47	15.6
d460	Moving around in different locations	4	2.1	28	24.6	22.5		32	10.6
d465	Moving around using equipment	3	1.6	21	18.4	16.8		24	7.9
d470	Using transportation	23	12.2	6	5.3	6.9		29	9.6
d475	Driving	25	13.3	6	5.3	8		31	10.3
d510	Washing oneself	41	21.8	45	39.5	17.7		86	28.5
d520	Caring for body parts	5	2.7	28	24.6	21.9		33	10.9
d530	Toileting	7	3.7	29	25.4	21.7		36	11.9
d540	Dressing	47	25.0	49	43.0	18		96	31.8
d550	Eating	33	17.6	57	50.0	32.4		90	29.8
d560	Drinking	8	4.3	47	41.2	36.9		55	18.2
d570	Looking after one's health	5	2.7	11	9.6	6.9		16	5.3
d620	Acquisition of goods and services	6	3.2	16	14.0	10.8		22	7.3
d630	Preparing meals	28	14.9	13	11.4	3.5		41	13.6
d640	Doing housework	36	19.1	33	28.9	9.8		69	22.8
d650	Caring for household objects	26	13.8	17	14.9	1.1		43	14.2
d750	Informal social relationships	28	14.9	5	4.4	10.5		33	10.9
d760	Family relationships	32	17.0	10	8.8	8.2		42	13.9
d770	Intimate relationships	28	14.9	4	3.5	11.4		32	10.6
d845	Acquiring, keeping and terminating a job	12	6.4	3	2.6	3.8		15	5.0
d850	Remunerative employment	43	22.9	14	12.3	10.6		57	18.9
d855	Non-remunerative employment	22	11.7	8	7.0	4.7		30	9.9
d920	Recreation and leisure	45	23.9	19	16.7	7.2		64	21.2
Environmental Factors									
e110	Products or substances for personal consumption	34	18.1	22	19.3	1.2		56	18.5
e115	Products and technology for personal use in daily living	80	42.6	36	31.6	11		116	38.4
e120	Products and technology for personal indoor and outdoor mobility and transportation	1	0.5	17	14.9	14.4		18	6.0
e580	Health services, systems and policies	143	76.1	72	63.2	12.9		215	71.2

Table 6. Frequency of 2nd-level ICF categories from the component Activities and Participation and Environmental Factors, considered in $\geq 5\%$ of 302 studies, by type of hand condition. ICF categories addressed in $\geq 25\%$ of all studies are printed in bold ($n=8$).

5.4 Discussion

This part of the doctoral thesis provides an overview of the areas of functioning and health addressed in the scientific research on hand conditions. It was demonstrated that the ICF is a valuable tool to analyze the information derived from the identified studies and to highlight the most common aspects of functioning as well as those that deserve more consideration in research on hand conditions. The impact of hand conditions on health and health-related domains is reflected in the large number of different ICF categories (n=152) identified in this systematic review.

Mobility of joints, muscle power functions and pain are the aspects of functioning most frequently addressed in the component Body Functions. This is in line with studies on conditions such as hand osteoarthritis [61], scleroderma [62], Dupuytren's contracture [63], systemic lupus erythematosus [64] or digit amputations [65], reporting pain, reduced hand mobility and grip force as crucial functional impairments. Considering the different types of hand conditions separately reveals only few differences between the groups regarding the mobility and muscle power aspect. Pain, however, seems to be an issue, which is far more often explored in studies on conditions of the hand than in conditions involving the hand. The results further show that among Body Functions mental functions such as emotional functions (e.g. anxiety) or sleep functions (e.g. maintenance of sleep) are only rarely taken into account, neither in studies on conditions of the hand nor in studies on conditions involving the hand. Since many investigations demonstrate, however, that these mental functions are important to health from the patient perspective [66-72], it would be worthwhile to increase the focus of scientific research on the impact of hand conditions on mental functions.

Besides frequently provided information on structures of the upper extremity (bones, joints, muscles, ligaments and fasciae), outcomes on peripheral nerves of the upper extremity (linked to 's120 Spinal cord and related structures') were as well repeatedly addressed in the component Body Structures. Unsurprisingly, these outcomes were predominately of interest in the literature on conditions of the hand (addressed in almost one-fourth of the 188 studies). Structural damages to peripheral nerves following a traumatic incident more

commonly affect the upper limb than the lower limb [73,74]. Kouyoumdjian reported among a trauma population of 456 patients 557 peripheral nerve injuries and he found that in 73.5% of the cases the upper limb was affected [73]. Noble and colleagues investigated prevalence, cause and severity of limb peripheral nerve injuries in a multiple injured population of 5,777 patients [74]. They also found that in the majority (60.5%) of patients with structural nerve damages in the limbs, the injury occurred in the upper extremity. As summarised by Campbell [75], the peripheral nerves are most often damaged by stretch-related injuries, as for example due to motor vehicle accidents and by lacerations caused by glass, knife, long bone fractures etc. Besides that, compression is an important mechanism leading to structural impairments of the nerves, as stated by Campbell [75]. One can differentiate between acute and chronic nerve compression injuries [76]. In contrast to acute nerve compression injuries, which seem to be well explored, different concepts exist concerning the pathophysiology of chronic nerve compression injuries [41,76]. According to the two mainly used classifications of peripheral nerve injuries, which are based on Seddon [43] and Sunderland [55], CTS, for example, is on the one hand classified in the literature as Axonotmesis (i.e. with axonal damage) [77] and on the other hand as Neurapraxia (i.e. without axonal damage) [76]. Regardless the different theories concerning the pathophysiology of neuropathies, structural impairments of peripheral nerves, in general, are of outstanding importance to individuals with hand conditions, which is in agreement with other studies [32,78,79] performed in this field.

Mobility related to hands and arms, such as 'fine hand use' or 'hand and arm use' were the dominant aspects of functioning among Activities and Participation due to their presence in a lot of standardized outcome measures and performance tests [52,80]. Notably, 59 different ICF categories (i.e. 39% of 152) refer to the Activities and Participation domain. This emphasizes that the impact of hand conditions on a broad range of activities of daily living such as, 'Washing oneself', 'Dressing', 'Eating', 'Doing housework' is well addressed in the literature. Overall, activities and participation domains were, however, reported less frequently than the main body functions (i.e. 'Sensation of Pain', 'Mobility of joint functions' and 'Muscle power functions'). A closer inspection of the data shows that differences exist between the various types of hand conditions, regarding the

activities and participation domains reported in the literature. For example, functioning aspects related to a person's body position (e.g. changing, maintaining a position or transferring oneself) as well as aspects related to movement, such as walking or moving around, are of less relevance in conditions of the hand, however, show high prevalence in conditions involving the hand. Since conditions involving the hand often are of a neurological nature, implying that in many cases other parts of the body are as well affected, the observed difference in these domains becomes quite understandable.

The results of this systematic review also indicate that activity limitations and participation restrictions are not systematically considered yet in research on hand conditions. For example, further mobility functions such as 'd475 Driving' and 'd470 Using transportation' are only rarely addressed (each considered in about 10 % of all included studies, with only marginal differences between the different types of hand conditions), even though these aspects have been stated as important from the patient's perspective [66,69,70] and might restrict patients with hand conditions in, e.g. returning to work or being able to socialize with friends and family. Instrumental day-to-day self-care functions or domestic life functions as well as communications aspects were also overlooked. Especially studies on conditions of the hand for example failed to address functioning aspects such as 'd520 Caring for body parts', 'd530 Toileting', 'd560 Drinking', 'd620 Acquisition of goods and services' and 'd360 Using communication devices and techniques', which were only reported in about 3% of the analysed studies. There is no doubt that, to widen our knowledge regarding the burden and impact of hand disorders on patients' health and as a consequence, to further develop patient-oriented care [81], we need to be aware if and to what extent patients experience limitations in certain functioning aspects which are not adequately captured in scientific research.

Environmental Factors in general are infrequently addressed. They must be seen in close interaction with the components of functioning and disability. Per definition the Environmental Factors cover, "(...) *the physical, social and attitudinal environment in which people live and conduct their lives*" (WHO, 2001, p.16) [38], and can have a facilitating or limiting impact on a person's health and related

domains . For example, using splints can facilitate the performance of activities of daily living but, might also be experienced as a barrier causing inconvenience or discomfort [65,67,82,83]. Further, aesthetic changes in the affected hand [66,70] might lead to experience of stigma or isolation in the patients' social environment. The whole classification provides in this component 74 different second-level ICF categories in five chapters ranging from 'products and technology', 'natural environment and human-made changes to environment' to 'support and relationship', 'attitudes' and 'services, systems and policies' [84]. From the 152 different ICF categories identified in this review, little more than one-tenth refer to the component Environmental Factors and beyond that only two of them were addressed in more than 25 percent of the studies. Previous studies on different types of hand conditions have shown that e.g. attitudes and support of family, friends, colleagues or health professionals, are essential for a person's ability to cope with the consequences of the disease [37,85-87]. However, the results of this review show that current research activities lack to further explore these aspects and mainly focus on 'e5800 Health services' conducted, 'e1151 Assistive products and technology for personal use in daily living' utilized and 'e1101 Drugs' applied.

It must be recognized that the use of the ICF for analyzing scientific research publications, indicates possible weak areas of the classification system. For example, in the components Body Functions and Structures, the ICF does not provide sufficiently specific codes at the third and fourth level, to describe in detail the problems of individuals suffering from an injury or a condition of the hand. The assessment of impairment in nerves of the arm or the hand is frequently addressed in studies on hand patients, as it can have a tremendous effect on hand function [32,79]. The most specific code provided by the ICF to capture this information is 's120 Spinal cord and related structures'. Selecting this code is not incorrect since nerves of the arm and hand are structures related to the spinal cord, however, the code might not be sufficiently detailed for clinical purpose. The same applies for body structures such as arteries or veins of the arm and hand, as well as strength in muscles of the hand or mobility in joints of fingers. The information reported in the included studies was more precise than the information provided by the ICF category that was selected. These findings underline the need for including more specific ICF categories addressing the upper extremity and

hand in future versions of this classification. As hand conditions cover a large spectrum of different diseases and injuries, they impact upon a highly diverse set of functioning aspects. Having more specific ICF categories about the hand would enable clinicians to describe patients functioning after experiencing a certain condition or injury of the hand more precisely.

Based on the methodology used in this review, I could also provide an overview of the most frequently used standardized outcome measures and clinical assessments. There is an large number of outcome measures referring to problems in functioning of individuals with hand conditions [51,53]. These measures have been developed from different perspectives. Some, such as the Arthritis Hand Function Test (AHFT) [88], the Boston Carpal Tunnel Questionnaire (BCTQ) [89,90], or the Gartland and Werley Score [91], are disease specific measures, developed to address the specific limitations of the hand following a specific disease or injury of the hand, as for example rheumatoid arthritis, osteoarthritis, CTS, or Colles' fracture. Others, such as the Hand Mobility in Scleroderma Test (HAMIS) [92], the JHFT [42] or hand dynamometers have been developed from the perspective of a certain aspect of functioning and disability, assessing for instance impairments due to hand conditions in mobility of the hand, fine hand use, or grip strength. Moreover, some instruments focus on limitations in activities and participation due to hand conditions, such as the PRWE [41] and the Disabilities of the Arm Shoulder and Hand Questionnaire (DASH) [93], or intend to evaluate various health-related domains following hand disorders as for example the Michigan Hand Outcomes Questionnaire (MHQ) [94].

There already have been some efforts to review the literature on the different instruments specialized to hand conditions. Two reviews concentrate on the outcome measures used in CTS [95] and in individuals with tetraplegia to assess motor function [96]. Van de Ven-Stevens and colleagues [80] and Schoneveld and colleagues [54], however, concentrate on the measures developed to address limitations in activities and participation, and Changulani and colleagues [53] give an in detail analysis of four commonly used instruments for evaluating wrist and hand function. Most of these reviews provide a broad description of the measures and report their psychometric properties.

A separate consideration of the identified instruments by type of hand condition shows that the majority (65%) of the overall extracted standardised measures (i.e. standardised patient reported measures and health professional reported measures, as well as standardised performance tests) was applied in studies on conditions involving the hand, such as stroke, rheumatoid arthritis or systemic sclerosis etc. Studies on conditions of the hand primarily report clinical assessments. For example, aspects such as mobility in joints, grip strength or pain were assessed in almost half of these studies, respectively. Thereby, the sole exception is the assessment of movement performance / motor control, which seems to be an issue predominately of interest in studies on conditions involving the hand. In these studies, half of the used standardized measures were health professional reported measures followed by standardized performance tests (30%). Given that among the identified studies on conditions involving the hand, the major conditions had a neurological cause (e.g. stroke) potentially associated with cognitive impairments, the particularly use of health professional reported measures does not surprise. Studies on patients with conditions of the hand, however, more frequently apply patient reported measures (56 percent), followed by health professional reported measures and less frequent used standardized performance tests.

The decision to use a certain outcome measure often depends on its psychometric properties and on existing reference data. However, widely used instruments may not always be the best to address the aim of a study. For example the SF-36, a questionnaire frequently used in studies on hand conditions does not address sleep functions which is an impairment in these patients [97]. Outcome measures frequently used in a certain field of research can be analyzed by linking its content to the corresponding component or category of the ICF. Thus, the classification system offers a valuable frame to perform content validity analyses of assessment instruments [98,99]. Consequently, various outcome measures become comparable [98,100]. This facilitates the decision on the adequate outcome measure to choose regarding the study aim and informs about contents not yet captured in the different outcome measures [66].

There are also some limitations in this part of the doctoral thesis that needs to be mentioned. Firstly, it is important to bear in mind that solely English language studies, published in the literature databases over a limited period of time (1998–2008) were included. Therefore, this work systematically omits some publications. Secondly, the majority of the included studies (81%) were published in countries referring to the WHO regions Europe and The Americas. Scientific work that has been performed in countries of the WHO regions Eastern Mediterranean, South-East Asia and Africa is underrepresented. Thirdly, only a random sample of 15 percent of the retrieved studies was analyzed for practical reasons. Fourthly, in this study, the contents of the identified outcome measures were analyzed to obtain the required information. However, the psychometric properties of the different measures have not been evaluated as this, for example, has been described by Schoneveld and colleagues [54] or van de Ven-Stevens and colleagues [80]. Finally, it was not feasible to link all information obtained from the studies to the ICF. Some concepts refer to health conditions, or personal factors, which are not coded or classified. Others were not specified in sufficient detail to allow linking. However, the small portion of concepts that had to be considered as ‘not covered’ by the ICF (3.4%) is in line with other linking experiences that also show a percentage of about 3 percent of concepts to be ‘not covered’ [101-103].

This review gives an overview of how functioning is captured in scientific research on hand conditions, by analyzing the content of published studies based on the biopsychosocial view of functioning, disability and health. It reports the ICF categories commonly being addressed in the published literature and highlights those that might deserve more consideration in research on hand conditions. Further, this review provides an overview of the most frequently used standardized outcome measures and clinical assessments. The ICF could be used as a valuable and neutral frame to identify, group and quantify the information retrieved from the included studies. The findings from this part of the doctoral thesis show that research activity needs to widen its focus on mental functions, further mobility functioning, self-care and domestic life aspects to encompass the impact of hand conditions, potentially experienced by patients affected. Furthermore, the influence of the environment on patient’s health status should be considered more

systematically. This would increase our knowledge about how hand conditions affect patients' functioning and health and would help to ensure patient-oriented care.

6 Study II: Functioning aspects explaining patients' general health

6.1 Objective

The overall objective of this part of the doctoral thesis is to contribute to our knowledge, what are the most essential areas of functioning in individuals with hand conditions that should be addressed in clinical research and practice. The first specific aim is to identify a set of ICF categories that contributes most to the variation in patients' general health. The second specific aim is to study, whether the statistical selection of ICF categories is different from an expert-driven selection.

6.2 Methods

6.2.1 Study design

A multi-centre cross-sectional study was conducted including patients with different types of hand conditions from four study centres in Germany to gather information from a wide spectrum of hand conditions. The study protocol and consent forms were approved by the Ethics Committee of the Medical Association, Hamburg and the ethics committee of the Ludwig-Maximilians-University Munich. The study was carried out based on the principles of the Declaration of Helsinki.

6.2.2 Sample

Patients were included, if they (1) suffered either from a disease, disorder or injury located at the hand or from a disease, disorder or injury not directly located at the hand, but affecting the hand, (2) were at least 18 years of age, (3) had no mental disorder, (4) understood the purpose of the study and (5) signed the informed consent after the whole study was explained to them. Types of

hand conditions considered were differentiated into (1) conditions of the hand and (2) conditions involving the hand. Whilst the former include disorders or diseases as well as injuries located directly at hand, wrist or forearm level (such as CTS, Dupuytren's disease or fractures etc.), the latter cover diseases or injuries originating external to the hand but affecting the hand (such as rheumatoid arthritis, stroke, Parkinson's disease or brachial plexus injuries etc.).

6.2.3 Measures

The health professionals conducted interviews using the Comprehensive ICF Core Set for Hand Conditions [57]. The Comprehensive ICF Core Set lists 117 ICF categories of which 27 (23%) refer to Body Functions, 10 (9%) to Body Structures, 38 (32%) to Activities and Participation and 42 (36%) to Environmental Factors (see Appendix 1). It has been developed as a tool to describe functioning and disability of individuals with hand conditions, based on a biopsychosocial view.

The patients filled in the Disabilities of the Arm, Shoulder and Hand Questionnaire (DASH) [104]. The DASH questionnaire is a patient self-report instrument, developed by the American Academy of Orthopedic Surgeons in collaboration with further organizations, which aims to assess physical function and symptoms of individuals with musculoskeletal disorder of the upper limb [104]. It consists of 30 items in the disability/symptom section and two optional sections, containing four sport/music-related items as well as four work-related items. The calculated DASH-Score can range between 0 and 100, whereas a value of 0 indicates optimal physical function without disability and a value of 100 indicates greatest disability.

Both patients and health professionals used a visual analogue scale similar to the EuroQol (EQ VAS) [105] to rate patients' current general health from 0 (worst) to 100 (best).

In addition, socio-demographic data regarding gender, age, marital status, living situation, education status, occupation and setting were collected. Disease-related data included type of hand condition, affected side, handedness and grip strength (see Appendix 4).

The statistically identified set of ICF categories that contributes most to the variation in patients' general health was compared to an expert-driven selection, as provided by the Brief ICF Core Set for Hand Conditions. The Brief ICF Core Set for Hand Conditions includes a list of 23 ICF categories, taken from the Comprehensive ICF Core Set for Hand Conditions, of which 9 (39%) refer to Body Functions, 3 (13%) to Body Structures, 8 (35%) to Activities and Participation and 3 (13%) to Environmental Factors. It has been developed as the minimal international standard to report about a patient's functioning, that should be taken into account in any patient, irrespective of the type of hand condition and the health care setting in which they are treated.

6.2.4 Data collection

Patients were recruited at (1) the Department of Hand Surgery, Plastic and Microsurgery at the BG Trauma Hospital Hamburg, (2) the Department of Plastic and Hand Surgery, Burns Unit at the BG Clinic Bergmannstrost Halle, (3) the Department of Hand, Replantation and Microsurgery at the Trauma Hospital Berlin and (4) the Institute for Health and Rehabilitation Sciences of the Ludwig-Maximilians University Munich. Patient recruitment as well as data collection was performed by health professionals from the respective study centres. The author of this doctoral thesis personally concentrated on patient recruitment and data collection of individuals with conditions involving the hand.

Health professionals involved in the study, were trained by the author of this doctoral thesis in a one-day workshop on the methods of data collection. Further, a case example was presented to the health professionals during this workshop, based on which the interview situation was trained in a role-play. Additionally, they were provided with an interview manual, which contained a detailed description of how to perform the interviews as well as examples of how to question the patient during the interview. Previously to the interview, the health professionals obtained demographic and clinical data from patients medical records. The interview itself was conducted in a structured format, i.e. the interviewer rated the level of impairment or limitation (or restriction) in each ICF category referring to functioning (i.e. part 1 of the ICF) with a Visual Analogue Scale (VAS) ranging from 0 (no problem) to 100 (total problem). For the

components Body Functions and Body Structures, health professionals' appraisal solely based on the clinical information retrieved from the medical records and on their knowledge of the patient (with the exception of the categories referring to the chapter 'b1 – Mental Functions', which were rated in dialogue with the patients). Regarding the component Activities and Participation as well as the Environmental Factors, the health professionals took into consideration the information derived from the patients. However, the interviewers rated the amount of limitation (or restriction) in Activities and Participation and the degree of Environmental Factors from their clinical perspective. In the Environmental Factors component, a comparable VAS where categories could have been either a facilitator or a barrier was applied.

In all components, an additional response option '8' was used to indicate that a problem exists in a particular category, however not enough information was available to rate the degree of patients' problems. The option '9' was used when a particular category was not applicable and 'k.i. – no information' was used when no information was available at all. Further, the option 'C - comorbidity' was used when an existing problem in a particular category was determined exclusively due to an existing comorbidity and not due to the hand condition.

6.2.5 Data preparation

In this study, some of the ICF categories used in data collection slightly deviated from the original Comprehensive Core Set categories: the ICF Core Set categories 'b7300 Power of isolated muscles and muscle groups' and 'b7301 Power of muscles of one limb' were recorded at their respective second level, i.e. 'b730 Muscle power functions'. Further, the ICF Core Set category 's770 Additional musculoskeletal structures related to movement' was not recorded, to keep the focus on the structures of the upper extremity. For the ICF Core Set category 'd4408 Fine hand use, other specified', the specification 'pinch grip' was added and 'd4458 Hand and arm use, other specified' was omitted as no specification was clinically indicated.

ICF categories which showed a prevalence of problems in $\leq 10\%$ or $\geq 90\%$ of the included participants were removed from the analyses. This was related to

's7302 Structure of the hand' (91.2%), 'e310 Immediate family' (93.1%) and 'e355 Health professionals' (91.5%), as well as to 's710 Structure of head and neck region' (10.0%). Consequently, the analyses were performed with 110 ICF categories: 26 from the component Body Functions, 7 from Body Structures, 37 from the component Activities and Participation and 40 categories from the Environmental Factors.

To each ICF category of the component Environmental Factors two variables were assigned – one contained the facilitator values and one the barrier values. The facilitator variable was coded with the letter 'f' and the barrier variable was coded with the letter 'b'. For example, the ICF category 'e225 Climate' became 'e225_f Climate – facilitator' and 'e225_b Climate – barrier'.

The response option '9' was set to '0' (no problem) based on the assumption that a non-applicable ICF category cannot be a problem. The response options '8' and 'k.l. – no information' were set to missing values. Further, when the response option 'C - comorbidity' was used, the VAS value was set to '0' (no problem) as the problem exists due to another health condition.

Missing values in the ICF categories were replaced five times by multiple imputations with the assumption of an arbitrary missing pattern. To do this, the MI procedure of the SAS/STAT Software was used, which created multiply imputed data sets for incomplete multivariate data [106]. Consequently, analyses were performed with five imputed datasets.

6.2.6 Data analyses

Descriptive analyses

Descriptive statistics were used to analyze the socio-demographic data, the DASH-Score, patients' self-perceived general health as well as patients' general health rated from the health professionals. Descriptive data analyses were performed with SAS 9.1.

Explorative analyses

To identify the set of ICF categories from the Comprehensive ICF Core Set for HC that contributes most to variation in patients' general health, multiple linear regression analyses were applied. Two study outcomes were included as dependent variables: (1) patients' self-perceived general health and (2) patients' general health rated from the health professionals. The ICF categories from the Comprehensive ICF Core Set for Hand Conditions formed the independent variables. Mallows' C_p [107] was used as selection criterion to identify the subset of ICF categories that best explain variation in patients' general health. Variable selection was carried out for the two dependent variables by the following steps:

- 1) Regression within ICF components: Regression analyses were performed to identify the ICF categories that best explain patients' general health in each ICF component: Body Functions, Body Structures, Activities and Participation, Environmental Factors as facilitators and Environmental Factors as barriers.
- 2) Regression across ICF components: Regression analyses were performed across the components referring to functioning (i.e. Body Functions, Body Structures, Activities and Participation) and across the Environmental Factors component, using the categories identified in step 1. To define the relevant set of ICF categories across the components, the plausibility of the direction of the effect (i.e. the higher the problem in the ICF category, the worse is the predicted general health status) was considered. Thus, only ICF categories having a regression coefficient with a plausible algebraic sign were selected.

- 3) Correction for correlation: Pearson correlation coefficients between the ICF categories selected in step 2, and with the two dependent variables were calculated. In case of correlation within the ICF categories of >0.5 , the ICF category showing a higher correlation with the corresponding dependent variable was kept, respectively.

For the ICF categories selected in each step, the amount of explained variance (R^2) of the patients' general health was calculated, using linear regression analysis. Explorative data analyses were performed with SAS 9.1.

Comparison of the identified set of ICF categories with the Brief ICF Core Set for Hand Conditions

The statistically identified final sets of ICF categories (one for each dependent variable) were compared to the ICF categories of the Brief ICF Core Set for Hand Conditions, to investigate, whether the statistical selection is different from an expert-driven selection, as provided by the Brief ICF Core Set. A Brief ICF Core Set category was considered statistically confirmed if it remained in one of the final sets of ICF categories or in both, either on the same or on a higher level of specification. Due to the hierarchical structure of the ICF, more specific third- or fourth-level categories share the attributes of less specific second-level categories (see Table 1).

6.3 Results

Descriptive analyses

Between February and June 2010, 260 patients (mean age 46 years, 65% male) were recruited in the BG Trauma Hospital Hamburg (n=148), the BG Clinic Bergmannstrost Halle (n=45), the Trauma Hospital Berlin (n=50) and at the Institute for Health and Rehabilitation Sciences in Munich (n=17). The participants' socio-demographic and disease related characteristics are shown in Table 7.

	n	%
Female	91	35.0
Male	169	65.0
Mean age, years (range)	46 (19-82)	
Living status		
Living alone	59	22.8
Living not alone	196	75.7
Not available	4	1.5
Occupation		
Paid employment	192	73.8
Self-employment	14	5.4
Home / retired	27	10.4
Unemployed	21	8.1
Others	6	2.3
Setting		
Inpatient	173	66.5
Outpatient	87	33.5
Handedness		
Right-handed	242	93.1
Left-handed	17	6.5
Type of hand condition		
Injury of the hand	183	70.4
Disease of the hand	58	22.3
Injury / disease involving the hand	19	7.3
Affected side		
Right hand	127	48.8
Left hand	117	45.0
Both hands	16	6.2

Table 7. *Socio demographic and disease related characteristics of the participants (N=260).*

From 260 interviews, 199 (76.6%) were conducted by physicians, 30 (11.5%) by occupational therapists, 12 (4.6%) by physical therapists and two (0.8%) interviews were conducted by nurses. All clinical interviewers were closely involved in patients' care in the respective study centres. The author of this doctoral thesis conducted 17 (6.5%) interviews as well.

The majority of the patients suffered from injuries of the hand (70.4%). Most frequent diagnosis were: fractures at wrist and hand level (19%), fracture at forearm (17%), dislocation, sprain and strain of joints and ligaments (12%), injury of muscle and tendon (12%), traumatic amputation of wrist and hand (10%) (see Table 8).

ICD 10	Diagnosis	n	%
Participants with injury or condition of the hand (n=241)			
S62	Fracture at wrist and hand level	48	18.5
S52	Fracture of forearm	44	16.9
S63	Dislocation, sprain and strain of joints and ligaments at wrist and hand level	31	11.9
S66	Injury of muscle and tendon at wrist and hand level	31	11.9
S68	Traumatic amputation of wrist and hand	26	10.0
S61	Open wound of wrist and hand	21	8.1
L03	Cellulitis	17	6.5
T23	Burn and corrosion of wrist and hand	17	6.5
M89	Algoneurodystrophy	14	5.4
S64	Injuries of nerves at wrist and hand level	13	5.0
M19	Arthrosis	10	3.8
S60	Superficial injury of wrist and hand	10	3.8
G56	Mononeuropathies of upper limb	9	3.5
M65	Synovitis and tenosynovitis	7	2.7
T92	Sequelae of injuries of upper limb	7	2.7
Participants with injury or condition involving the hand (n=19)			
I60-I69	Cerebrovascular diseases	4	1.5
M06	Other rheumatoid arthritis	2	0.8
C50	Malignant neoplasm of breast	2	0.8
S14	Injury of nerves and spinal cord at neck level	2	0.8
D48	Neoplasm of uncertain or unknown behaviour of other and unspecified sites	1	0.4
G12	Spinal muscular atrophy and related syndromes	1	0.4
G35	Multiple sclerosis	1	0.4
M34	Systemic sclerosis	1	0.4

Table 8 to be continued

Table 8 continued

ICD 10	Diagnosis	n	%
M50	Cervical disc disorders	1	0.4
P14	Birth injury to peripheral nervous system	1	0.4
R02	Gangrene, not elsewhere classified	1	0.4
S42	Fracture of shoulder and upper arm (humerus)	1	0.4
S44	Injury of nerves at shoulder and upper arm level	1	0.4

Table 8. *Diagnosis of the participants (N=260). Note: Multiple diagnoses per participant are possible.*

Median time from injury to interview was 103 days for patients having an injury located directly at the hand (n=233), 97 days for patients having a disorder / disease located directly at the hand (n=58) and 1,040 days (34 months) for patients with an injury / disease originating external to the hand but affecting the hand (n=19), respectively. Participants had a mean DASH-Score of 42.7 with a standard deviation (SD) of 22.25. Table 9 shows time since injury or disease and the mean DASH-Score stratified for type of hand condition.

	Injury of the hand (n=183)	Disease of the hand (n=58)	Disease or injury involving the hand (n=19)	Total study population (n=260)
DASH-Score [†] , mean (SD)	40.8 (22.42)	46.4 (19.99)	48.4 (24.67)	42.7 (22.25)
Time since injury / disease				
in days, median [‡]	103	97	1040	106
in months, median [‡]	3.4	3.2	34.2	3.5

DASH = Disabilities of the Arm, Shoulder and Hand Questionnaire [93]
[†] Data analysed n=254
[‡] Data analysed n=250

Table 9. *Time since injury or disease and DASH-Score stratified for type of hand condition.*

Patients rated their general health on a visual analogue scale ranging from 0 (worst) to 100 (best) with a mean of 66.4 (SD = 18.76). Health professionals rated patients' general health with a mean of 75.0 (SD = 16.56) (see Table 10).

	Injury of the hand (n=183)	Disease of the hand (n=58)	Disease or injury involving the hand (n=19)	Total study population (n=260)
General health [†] , mean (SD):				
Patients' self-perceived general health	67.4 (17.80)	63.5 (20.91)	61.0 (20.34)	66.4 (18.76)
Health professionals' rated general health [‡]	75.7 (15.72)	74.9 (17.23)	71.2 (16.10)	75.0 (16.56)

[†] General health was assessed, using a visual analogue scale from 0 (worst) to 100 (best).
[‡] Patients' general health rated from the health professionals

Table 10. General health status rated from patients and health professionals.

Explorative analyses

The analyses were performed on a data set containing 150 independent variables (i.e. ICF categories). The first step, 'Regression within ICF components', resulted for the outcome *'patients' self-perceived general health* in 62 ICF categories explaining 48% ($R^2 = 0.485$) of the variance and for the outcome *'patients' general health rated from the health professionals* in 47 ICF categories with an explained variance (R^2) of 0.368. In this first step, for the patients' self-perceived general health, the Environmental Factors – barrier component and the Body Structures component had the highest proportion of categories remaining in the final model. For the health professionals' rated general health, the Body Functions component and Environmental Factors – barrier component had the highest proportion of categories that remained in the final model. The second step, 'Regression across ICF components', based on the results from the first step. The final model contained for patients' self-perceived general health 31 ICF categories explaining 28% ($R^2 = 0.285$) of the variance and for health professionals' rated general health 18 ICF categories with $R^2 = 0.155$. The third step, 'Correction for correlation', resulted in the final sets of ICF categories that best explained variation in patient's general health. For patients' self-perceived general health, the 25 categories that remained in the final model had an explaining variance of $R^2=0.261$ and for health professionals' rated general health the final 16 ICF categories had an explaining variance of $R^2=0.154$.

Table 11 summarizes the single steps of the explorative analyses. It shows the number of ICF categories per component 1) of the Comprehensive ICF Core Set for Hand Conditions, 2) of those that have been analysed, 3) after regression analyses performed within the components, 4) after regression analyses performed across the functioning components and the Environmental Factors components, and 5) of the final sets after correction for correlations. Furthermore, the total number of ICF categories included in each set as well as the amount of explained variance (R^2) for every set of ICF categories is presented.

	ICF component	1) Comprehensive ICF Core Set	2) Categories analysed	3) Regression within ICF components	4) Regression across ICF components	5) Final Sets - correction for correlation
<i>patients' self-perceived general health</i>	b	27 [†]	26	5	2	2
	s	10 [‡]	7	4	2	2
	d	38 ^{**}	37	11	6	4
	e-f	42 ^{††}	40	16	8	4
	e-b		40	26	13	13
	Total		117 (23)*	150 (23)*	62 (14)*	31 (10)*
	R^2		0.669	0.485	0.285	0.261
<i>patients' general health rated by the health professionals</i>	b	27 [†]	26	10	2	2
	s	10 [‡]	7	1	1	1
	d	38 ^{**}	37	11	5	3
	e-f	42 ^{††}	40	8	3	3
	e-b		40	17	7	7
	Total		117 (23)*	150 (23)*	47 (14)*	18 (9)*
	R^2		0.583	0.368	0.155	0.154

Abbreviations:

b=Body Functions, s=Body Structures, d=Activities and Participation, e-f=Environmental Factors – facilitator, e-b= Environmental Factors – barrier;

*in brackets the number of Brief ICF Core Set categories contained in the sets of categories

[†] b7300 'Power of isolated muscles and muscle groups' and b7301 'Power of muscles of one limb' were recorded at their respective second level, i.e. b730 'Muscle power functions'.

[‡] s7302 'Structure of the hand' and s710 'Structure of head and neck region' were removed from the analyses due to prevalence of problems of 91.2% and 10.0%, respectively. The category s770 'Additional musculoskeletal structures related to movement' was not recorded, to focus on the structures of the upper extremity.

** d4458 'Hand and arm use, other specified' was omitted as no specification was clinically indicated.

†† e310 'Immediate family' and e355 'Health professionals' were removed from the analyses due to prevalence of problems of 93.1% and 91.5%, respectively

Table 11. Number of ICF categories per component 1) of the Comprehensive ICF Core Set for Hand Conditions, 2) of the categories that have been analysed, 3) after regression within components, 4) after regression across components, 5) final sets after correction for correlation among ICF categories.

Table 12 lists for each step of the regression analysis the ICF categories that contribute most to variation in patients' general health, reported by patients and health professionals, respectively.

ICF code	Title	Regression within ICF components		Regression across ICF components		Final Sets - correction for correlation	
		PAT	HP	PAT	HP	PAT	HP
<i>Body Functions</i>							
b134	Sleep functions	x		x		x	
b152	Emotional functions	x	x	x	x	x	x
b1801	Body image		x				
b265	Touch function	x	x				
b2703	Sensitivity to a noxious stimulus		x				
b7100	Mobility of a single joint		x				
b715	Stability of joint functions		x				
b730	Power of muscles functions	x	x				
b760	Control of voluntary movement functions		x		x		x
b780	Sensations related to muscles and movement functions		x				
b840	Sensation related to the skin		x				
b860	Functions of nails	x					
<i>Body Structures</i>							
s7300	Structure of upper arm	x		x		x	
s7301	Structure of forearm	x	x		x		x
s810	Structure of areas of skin	x					
s830	Structure of nails	x		x		x	
<i>Activities and Participation</i>							
d230	Carrying out daily routine	x		x		x	
d430	Lifting and carrying objects	x					
d4400	Picking up		x		x		
d4401	Grasping		x				
d4408	Fine hand use, other specified – pinch grip		x		x		x
d4450	Pulling	x	x	x	x	x	x
d4452	Reaching	x	x				
d4453	Turning or twisting the hands or arms		x		x		
d470	Using transportation		x				
d475	Driving	x					
d520	Caring for body parts	x		x		x	
d560	Drinking	x		x			
d570	Looking after one's health	x					
d620	Acquisition of goods and services	x	x	x	x		x
d630	Preparing meals		x				
d660	Assisting others		x				
d7	Interpersonal interactions and relationships	x					
d810 - d839	Education		x				
d840 - d859	Work and employment	x		x		x	
<i>Environmental Factors</i>							
e110	Products or substances for personal consumption		x				
e115^b	Products and technology for personal use in daily living	x	x		x		x
e125	Products and technology for communication		x				

Table 12 to be continued

Table 12 continued

ICF code	Title	Regression within ICF components		Regression across ICF components		Final Sets - correction for correlation	
		PAT	HP	PAT	HP	PAT	HP
e130	Products and technology for education	x	x				
e135^b	Products and technology for employment	x	x	x		x	
e140^f	Products and technology for culture, recreation and sport		x		x		x
e150^{b/b}	Design, construction and building products and technology of buildings for public use	x	x	x	x	x	x
e155^f	Design, construction and building products and technology of buildings for private use	x		x		x	
e165	Assets	x		x			
e225^{b/b}	Climate	x	x	x	x	x	x
e315	Extended family		x				
e320	Friends	x					
e325^b	Acquaintances, peers, colleagues, neighbours and community members	x		x		x	
e330^f	People in positions of authority	x	x		x		x
e335^b	People in subordinate positions	x	x	x		x	
e340	Personal care providers and personal assistants		x				
e345^{f/b}	Strangers	x	x	x	x	x	x
e360^b	Other professionals	x	x	x		x	
e410^b	Individual attitudes of immediate family members	x		x		x	
e420	Individual attitudes of friends		x				
e425^{f/f}	Individual attitudes of acquaintances, peers, colleagues, neighbours and community members	x	x	x	x	x	x
e430	Individual attitudes of people in positions of authority	x					
e440	Individual attitudes of personal care providers and personal assistants	x	x				
e450^b	Individual attitudes of health professionals	x		x		x	
e455	Individual attitudes of other professionals	x	x				
e460^b	Societal attitudes	x		x		x	
e465	Social norms, practices and ideologies	x	x	x			
e525^{b/b}	Housing services, systems and policies	x	x	x	x	x	x
e530	Utilities services, systems and policies	x	x				
e535	Communication services, systems and policies	x					
e540^{f/b}	Transportation services, systems and policies	x	x	x	x	x	x
e550^b	Legal services, systems and policies	x		x		x	
e555	Associations and organizational services, systems and policies		x				
e570	Social security services, systems and policies	x					
e575^b	General social support services, systems and policies	x	x		x		x
e580^b	Health services, systems and policies	x		x		x	
e585^b	Education and training services, systems and policies	x		x		x	

Note: ICF categories of the final sets are printed in bold

^b = Environmental factor remained as barrier in the final set of ICF categories

^f = Environmental factor remained as facilitator in the final set of ICF categories

PAT = Patients' self-perceived general health; HP = Patients' general health rated from the health professionals

Table 12. ICF categories that contribute most to variation in patients' general health according to the respective regression analyses, reported by the patients and the health professionals.

The final set of ICF categories that best explained variation in patients' general health contains in total 33 different ICF categories. Thereof 28 were identified on second hierarchical level of the ICF, four on third level, as well as one on block level. Considering the two different outcomes separately reveals 25 ICF categories for the outcome *'patients' self-perceived general health* and 16 ICF categories for the outcome *'patients' general health rated from the health professionals*.

Comparison of the identified set of ICF categories with the Brief ICF Core Set for Hand Conditions

Overall, the ICF categories selected by the statistical approach cover 52.2% (n=12) of the expert-driven selection, as provided in the 23 ICF categories of the Brief ICF Core Set for Hand Conditions. The categories of the Brief ICF Core Set for Hand Conditions are given in Table 13. Thereby, categories that match to the statistical selection are marked. Furthermore, to every category of the Brief ICF Core Set, the statistically retrieved confirming categories were listed.

Brief ICF Core Set categories, equally identified by the statistical analyses, are as follows: 'b152 Emotional functions', 'b760 Control of voluntary movement functions', 's730 Structure of upper extremity', 'd230 Carrying out daily routine', 'd440 Fine hand use', 'd445 Hand and arm use', 'd5 Self-care', 'd6 Domestic life', 'd840-d859 Work and employment', 'e1 Products and technology', 'e3 Support and relationships', 'e5 Services, systems and policies'. The Brief ICF Core Set contains among the component Activities and Participation the categories 'd5 Self-care' and 'd6 Domestic life' on chapter level. These categories could be specified by the statistical analyses, which revealed 'd520 Caring for body parts' and 'd620 Acquisition of goods and services' as essential activities among the domains 'Self-care' and 'Domestic life' to explain variation in patient's general health. Additionally, the statistical analyses resulted in a number of environmental factors on second-level essential to explain variation in patient's general health. These categories further specify the Brief ICF Core Set categories 'e1 Products and technology', 'e3 Support and relationships', 'e5 Services, systems and policies' (see Table 13).

The 23 Brief ICF Core Set categories			Brief ICF Core Set categories confirmed by	
ICF code	Title	Category confirmed	ICF code	Title
Body Functions				
b152	Emotional functions	√	b152	Emotional functions
b265	Touch function	no		
b270	Sensory functions related to temperature and other stimuli	no		
b280	Sensation of pain	no		
b710	Mobility of joint functions	no		
b715	Stability of joint functions	no		
b730	Power of muscles functions	no		
b760	Control of voluntary movement functions	√	b760	Control of voluntary movement functions
b810	Protective functions of the skin	no		
Body Structures				
s120	Spinal cord and related structures	no		
s720	Structure of shoulder region	no		
s730	Structure of upper extremity	√	s7300	Structure of upper arm
			s7301	Structure of forearm
			s7302	Structure of the hand
Activities and Participation				
d230	Carrying out daily routine	√	d230	Carrying out daily routine
d430	Lifting and carrying objects	no		
d440	Fine hand use	√	d4408	Fine hand use, other specified – pinch grip
d445	Hand and arm use	√	d4450	Pulling
d5	Self-care	√	d520	Caring for body parts
d6	Domestic life	√	d620	Acquisition of goods and services
d7	Interpersonal interactions and relationships	no		
d840-d859	Work and employment	√	d840-d859	Work and employment
Environmental Factors				
e1	Products and technology	√	e115	Products and technology for personal use in daily living
			e135	Products and technology for employment
			e140	Products and technology for culture, recreation and sport
			e150	Design, construction and building products and technology of buildings for public use
			e155	Design, construction and building products and technology of buildings for private use
e3	Support and relationships	√	e310	Immediate family
			e325	Acquaintances, peers, colleagues, neighbours and community members
			e330	People in positions of authority
			e335	People in subordinate positions
			e345	Strangers
			e355	Health professionals
			e360	Other professionals
e5	Services, systems and policies	√	e525	Housing services, systems and policies
			e540	Transportation services, systems and policies
			e550	Legal services, systems and policies
			e575	General social support services, systems and policies
			e580	Health services, systems and policies
			e585	Education and training services, systems and policies

Table 13. Comparison of the statistically identified set of ICF categories with the Brief ICF Core Set for Hand Conditions.

In addition, the statistically identified final set of ICF categories that best differentiates between the various levels of patient's general health comprised seven categories that were not included in the expert-driven selection of the Brief ICF Core Set for Hand Conditions. These are: 'b134 Sleep functions', 's830 Structure of nails', 'e410 Individual attitudes of immediate family members', 'e425 Individual attitudes of acquaintances, peers, colleagues, neighbours and community members', 'e450 Individual attitudes of health professionals', 'e460 Societal attitudes' and 'e225 Climate'.

6.4 Discussion

In this part of the doctoral thesis a set of ICF categories was identified that contributes most to variation in patients' general health. The essential aspects of functioning were selected from the Comprehensive ICF Core Set for Hand Conditions, using a purely statistical approach. It could be shown that the statistically selected ICF categories cover more than half of an expert-driven selection, offered by the Brief ICF Core Set for Hand Conditions. The information provided by the results of this study contributes to our knowledge about the crucial areas of functioning in individuals with hand conditions. In clinical research on hand conditions, these areas should be considered because they best differentiate between levels of general health in individuals with hand injuries or hand disorders. In clinical practice, they should be considered in addition to the Brief ICF Core Set for Hand Conditions to describe functioning in this specific patient population, especially when the patients are followed overtime.

ICF categories referring to functioning

About one third of the statistically identified ICF categories refer to the functioning components of the ICF classification system, i.e. to the components Body Functions, Body Structures and to Activities and Participation. Among the component Body Functions, we found for the patient-rated outcome that mental function aspects, i.e. 'b134 Sleep functions' and 'b152 Emotional functions', contribute most to explaining the variation in patients' general health. Emotional functions remained in the final sets of ICF categories for the two dependent variables, (1) the patients' self-perceived general health and (2) the patients' general health as rated from the health professionals. Various previous studies support these findings and underline the importance of mental function aspects in association with hand conditions [67-72,108]. Gustafsson and Ahlström found symptoms of trauma-related distress in one third and mood disorders in 10 percent of a patient population with traumatic hand injury, one year after the traumatic event occurred [36]. Although they noticed a decline in trauma-related distress symptoms in the first three months, no significant changes could be observed up to the one-year follow-up. A comparable proportion of posttraumatic stress disorders in hand injuries was identified in a study carried out by Williams and

colleagues [58]. They further detected a diminishing impact of posttraumatic stress disorders and depression on hand injured patient's general health status. Psychological and emotional symptoms, such as flashbacks, affective lability, anxiety, fear, stress or feeling down show not only high prevalence among severe hand injuries [108], but were also reported in conditions such as systemic sclerosis [68], Dupuytren's disease [67] or hand osteoarthritis [66]. Therefore, psychological treatment should not be overlooked in care of patients with hand conditions.

Further, among the Body Functions component, 'b760 Control of voluntary movement functions' remained in the final set of ICF categories that best explained variation in patients' general health, identified for the health professional rated outcome. As described in the ICF, this category consists of "*functions associated with control over and coordination of voluntary movements*" (WHO, 2001, p.100) which implies control of simple and complex voluntary movements, eye hand coordination, etc. as well as impairments such as control and coordination problems [38]. Limited control of voluntary movements critically influences everyday life activities, especially when the hands are affected. Schieber and Santello [109] describe the main forms of behavioural hand use and divide them into grasping tasks with simultaneous use of multiple digits and fine manipulation tasks such as painting or handwriting, requiring fine and individuated finger movements. Skilled control of finger movements and forces is essential to provide finger dexterity, which enables us to perform these tasks in day-to-day hand use [109]. Moreover, effective behavioural hand use is in need of controlled and well-coordinated movements of all further parts of the upper extremity. Sangole and Levine [110] state: "*From a functional point of view, the hand serves as an effector organ of the upper limb that supports the hand mechanically and allows it to adopt an optimal position for any given action*" (Sangole, 2007, p.81). Appropriately, Lang and colleagues [111] found that in people with hemiparesis, loss of hand function is related to loss of movement control in all segments of the upper extremity and does not solely depend on movement control in the more distal segments. They report active range of motion to explain most of the variance in hand function, however, did not investigate parameters such as movement time or movement velocity in this context [111]. Gao and colleagues [112] found that among stroke survivors decreased movement time and reduced movement

accuracy are the limiting parameters in eye-hand coordination performance in the affected hand. Taking into account that control of voluntary movement functions encompasses peripheral and central aspects (which might in total or in parts be impaired depending on the type of hand condition), it is not surprising that this ICF category seems to be a key feature to differentiate between the levels of health among people with hand conditions.

From the Body Structures component, unsurprisingly, the categories 's7300 Structure of upper arm' and 's7301 Structure of forearm' remained in the final set of ICF categories that best explained variation in patients' general health. On the other hand, the statistical analyses also revealed 's830 Structure of nails' as an essential aspect to contribute for the variation in general health, as considered for the outcome 'patients' self-perceived general-health'. One can assume that an injury or disorder of the hand might lead to complaints from the patients' point of view regarding the aesthetical appearance of hand and fingers, including the nails.

The classification system of the ICF provides nine domains in the component Activities and Participation, to capture the full range of a person's life areas [38]. The Comprehensive ICF Core Set for Hand Conditions, on which the analyses were based, covers all these domains referring to Activities and Participation, whereas the chapters 'd4 Mobility', 'd5 Self Care' and 'd6 Domestic Life' dominate, containing a higher number of different ICF categories. Nevertheless, the ICF categories identified in this work cover five from nine possible life areas. We identified for the patient-rated outcome 'd230 Carrying out daily routine', 'd445 Hand and arm use' (as specified by 'd4450 Pulling'), 'd520 Caring for body parts' and 'd840-d859 Work and employment' as main issues explaining variations in patients' general health. It is quite reasonable that the ability to carry out all daily routines seems to be related to a patient's level of general health. This aspect does not focus on carrying out a determined activity itself, however, covers the ability to "*plan, manage and complete the requirements of day-to-day procedures or duties [...]*" (WHO, 2001, p.130) [38]. Limitation in the proper use of the hand potentially will slowdown the performance of certain daily activities on the one hand, and on the other hand will force the individual to adopt

alternative, compensating strategies to realize a particular activity. Thus, it is less surprising that during the interviews patients often complained about the increased time required for their daily procedures, which consequently affects their ability to plan and manage the daily routine.

Furthermore, work and employment aspects were statistically selected, to contribute to variation in patient's general health after an injury or disorder of the hand had occurred. Average time off work was reported to range between three and eight weeks [31,113,114] or even more. It could be shown that the severity of hand injury is strongly related to the time period an individual is absent from work after experiencing such an injury [114]. Even longer time periods were published by Katz and colleagues [25] who investigated work absence following surgery in 181 individuals with CTS. They report 19% of the participants to be off work six months and 22% absent from work 12 months after surgery, respectively. Katz and colleagues [25] found a manifold picture of factors predicting time off work, involving clinical, demographic, economic, and workplace factors. Opsteegh and colleagues [115] also examined return to work in a population of individuals with hand disorders and hand injuries, however, in addition to clinical and work-related determinants further involved psychosocial determinants in their investigation. They report that symptoms of post-traumatic stress disorder were more frequent among patients who were absent from job longer than ten weeks, and that these symptoms were independent predictors for return to work in patients with acute hand injuries [115]. Regardless which are the factors that primarily predict whether a patient is capable to return to his previous job activities or not, it becomes apparent that functioning aspects related to work and employment are of particular importance to people with hand conditions and emphasize the need of specialized, patient-oriented programs to optimize rehabilitation [116].

Environmental Factors

The Comprehensive ICF Core Set for Hand Conditions lists 42 different environmental factors potentially relevant to individuals with hand conditions. Environmental factors, in general, closely interact with functioning and disability, and its impact on a person's performance might either be in a facilitating or in a restricting way [38]. In this study, almost two third of the statistically identified ICF

categories (i.e. 21 from 33) refer to the component Environmental Factors with all chapters being covered in the final set of categories that best explained variation in patients' general health.

Consistent with studies reporting the importance of products and technology for patients with hand conditions [65,82], four categories were identified referring to chapter 1 'Products and technology'. Products and technology for employment and for personal use in daily living as well as design, construction and building products and technology of buildings for private and public use, remained in the final set of ICF categories that explained variation in patients' general health. Among the study participants, these environmental factors affect patients' general health in a restricting way, since the majority of the 'e1 Products and technology' categories were included as barriers in the final statistical model. The included categories of chapter 3 and 4 reflect again the utmost importance of relationships and support for social participation, adjustment to the disease and quality of life [37,85,86]. In general, patients who participated in our investigation quantified the environmental factors more often as a barrier than as a facilitator. This might be due to the fact that many of the participants were inpatients, some of them with severe multiple hand injuries. These patients potentially were not able to cope with the consequences of their disease, have not yet managed the resulting emotions, might not have experienced adequate social support or probably have to face negative attitudes toward their health disorder finally leading to this perception.

The results of this study stress the important interdependency of general health with the environment, as it is also presented in the biopsychosocial view of the ICF [38], and underline this major aspect of an individual's well-being. A patient's degree of impairment in certain aspects of functioning (i.e. the amount of disability) depends on the circumstances in which the patient lives or actually is situated and on the activities someone needs or wants to perform. Thus, it is fundamental that clinicians and researchers take into account the different impacts of environmental factors when planning patient's rehabilitation or when designing tools for daily living assessment. Results of an assessment in a created setting might differ from the results of an assessment in the patient's natural environment

and therefore might lead to a biased perception of patient's disability. In accordance with our results a variety of studies, confirm the meaning of environmental factors for patients with hand conditions. These studies demonstrated, for example, that attitudes and support of health professionals, family members and friends or colleagues are crucial for patients to get along with the consequences of the disease [37,85,86,117] or highlight the necessity of products and technology to prevent restriction in performing activities of daily living [65,82].

Comparison of the identified set of ICF categories with the Brief ICF Core Set for Hand Conditions

One specific aim of this part of the doctoral thesis was to investigate, whether the statistical selection is different from an expert-driven selection, as provided by the Brief ICF Core Set for Hand Conditions. The decision on the ICF Core Sets for Hand Conditions integrated evidence from several studies and was based on a consensus finding process including expert appraisal at the conference. Therefore, it is necessary to point out that this study does not intent to query the validity of the Brief ICF Core Set for Hand Conditions, however, the author considered it significant to question whether another methodical approach would have revealed different or additional results, respectively.

Slightly more than 50 percent of the categories included in the Brief ICF Core Set for Hand Conditions were statistically identified as well, even if some were selected on another hierarchical level of the ICF. In the analyses performed, some additional categories could be identified that are not covered in the Brief ICF Core Set. Accordnig to the findings of this study, it is recommended to integrate 'b134 Sleep functions' in clinical assessment of functioning and disability in patients with hand conditions. After an injury or disorder of the hand, several problems related to sleep might arise concerning for example the ability to fall asleep, to sustain the state of being asleep or to get the required amount of sleep. Numerous previous studies have shown that patients experience noteworthy consequences for night sleep, for example, in hand osteoarthritis [66], systemic sclerosis [68], CTS [72] or hand injuries [71]. Despite these findings, however, it could be shown in chapter three of this work that sleeping functions seem to be a

topic rather understudied in scientific research on hand conditions. Thus, the statistical findings further highlight the demand for considering the impact of hand conditions on sleep in clinical research and practice. Furthermore, 'e225 Climate' was identified for both, the health professional rated and the patients' self-perceived outcome as limiting environmental factor. During the interviews the patients frequently complained about the negative effect of the outside temperature on their hands. They stated a higher sensitivity to weather resulting in increased pain, hypersensitivity or reduced mobility in finger joints of their affected hand, which did influence their general well-being. The experiences during the interview situation as well as the statistical findings indicate that it would be worthwhile to address 'e225 Climate' when describing patient's health and disability.

The Brief ICF Core Set for Hand Conditions does not contain any environmental factor referring to 'e4 Attitudes'. According to the ICF, attitudes follow a person's customs, values, norms and beliefs, which are considered "*the driving forces behind the attitudes*" (WHO, 2001, p.190) [38]. As stated by Fazio [118] attitudes guide a person's behaviour. He describes that attitudes filter an individual's perception, both, of an attitude object (e.g. a person) and of the context in which the attitude object is encountered. Thus, attitudes influence how a certain situation or event (including the person and the context) is perceived and as a consequence influence an individual's behaviour response in a particular situation [118]. Interestingly, the patients who participated in this study experienced attitudes of the immediate family, of the health professionals and societal attitudes as hindrance in association with their hand condition. One can assume that problems managing the additional burden determined by a patients' loss of autonomy after a hand condition might influence the attitudes of people living close to the affected person. Further, limited time and staff in clinical practice might prevent health professionals from paying particular attention to the patients' personal needs, problems and aspirations. This lack of attention, conversely, might lead to a patient's perception of negative attitudes among the health professionals. Moreover, people with hand conditions potentially have to face negative societal opinions due to their illness and their incapability to accomplish their tasks, for example, in their work situation or in their private surrounding.

Following the findings from our study and given the fact that environmental factors must be seen in close interaction with a person's functioning, we recommend to integrate the statistically identified categories referring to 'e4 Attitudes' when describing functioning in patients with hand conditions.

In total, the large number of environmental factors that have been statistically identified supports the decision experts took at the ICF Consensus Conference [119], regarding the selection of environmental factors categories for the Brief ICF Core Set for Hand Conditions. The attending experts (i.e. physicians, physical therapists, occupational therapists, nurses, and social workers all with many years of expertise in the treatment and care of patients with hand conditions) decided to include in the Brief ICF Core Set the following three environmental factors categories on the first level (i.e. chapter level) of the classification system: 'e1 Products and technology', 'e3 Support and relationship', and 'e5 Services, systems and policies' [57,119]. The experts agreed in regarding all of the underlying higher-level categories as important to describe functioning in this special patient population. Therefore, they considered the chapter level as appropriate to include all of them, which is supported by our findings

Study limitations

This work has some limitations that need to be considered when interpreting the results. Firstly, a convenience sampling procedure combined with a stratified sampling procedure was used. Therefore, the results of the study may not be representative. For example, a high proportion of inpatients were included in our study sample. This indicates that the population had severe hand conditions because the study centres involved in the study were mainly trauma hospitals. Future studies need to address this issue by including different health care institutions. Secondly, the majority of the study population (70%) of this national validation study were individuals with injuries of the hand. The proportion of patients suffering from injuries or conditions originating external to the hand but affecting the hand is underrepresented. Thus, we underline that additional analyses are required in study populations with different distributions regarding the health conditions included. Thirdly, the statistical approach revealed a large amount of unexplained variation in patients' general health. This may be probably

because the patients' personal factors were not considered in the statistical analyses, though their impact on the general health status might be substantial. Last, this study has only been performed in Germany. Therefore, other results could be found in other countries or settings.

In summary, a set ICF categories was identified from the Comprehensive ICF Core Set for Hand Conditions that best explained variation in patients' general health. Since the Comprehensive ICF Core Set for Hand Conditions was developed by integrating evidence from preparatory studies and an expert appraisal, it has to be emphasized that this ICF Core Set only includes ICF categories of substantial relevance in hand conditions. However, the statistically identified final set of categories deserves particular attention as these ICF categories differentiate between the levels of health after experiencing an injury or disorder of the hand. It could be shown that the selected set of ICF categories covers more than half of an expert-driven selection, as provided by the Brief ICF Core Set for Hand Conditions. Thus, the results of this study stress the suggestion that in clinical practice, health professional should consider the Brief ICF Core Set for Hand Conditions as the basic instrument to be used when describing functioning in patients with hand conditions. However, clinicians could complement the instrument by adding certain aspects of functioning from the statistically identified set of ICF categories, especially when following patients overtime.

7 Conclusion

In this doctoral thesis, the areas of functioning that represent the impact of hand conditions on individuals' functioning and health have been explored using the ICF as operational basis. A systematic literature review was performed and the content of published literature was analysed, revealing the areas of functioning and health addressed in the scientific research on hand conditions. Further, a study was performed in which, based on statistical analyses, the most essential areas of functioning were identified, that best differentiate among the patients' different level of general health.

The hand serves us in numerous daily activities, thus, a function deficit in the hand can have significant impact on independence, employability and the ability to perform all required tasks in day-to-day life. The problems patients experience are not only related to functions of body systems or to body structures but may also affect a person's ability to successfully carry out daily routine in domestic life, self care, work and leisure activities. While various problems might be common among patients with hand conditions, some are unique and strongly depend on the individual, their culture and social environment. An in-depth understanding of the manifold impact of hand conditions on functioning and health is necessary to integrate the whole person, their individual needs, life issues and environment in patient-oriented treatment and high quality care. Thus, it is important to know in clinical research and clinical practice what areas of functioning are relevant to patients with hand conditions.

The standardized language of the International Classification of Functioning, Disability and Health, helps clinicians to communicate about patients' needs and the effect of interventions on patients' health. It provides a conceptual framework and a unified standardized language for a more comprehensive description of the experience of patients suffering from a determined disease. Thus, the ICF serves as a useful tool to inform about functioning and health in individuals with hand conditions.

In the first part of this doctoral thesis the areas of functioning and health addressed in the scientific research on hand conditions were studied. A profound knowledge about how hand conditions impact on functioning and health in individuals with hand conditions could be provided. Further, potential gaps in the published literature were highlighted and an overview of the most frequently used standardized outcome measures and clinical assessments was presented. The large number of functioning areas identified reflects that hand conditions affects a patients' health in an extensive way. Certain functioning areas, such as mental functions as well as the influence of environmental factors on patient's health status should be considered more systematically. This would increase our knowledge in terms of what impacts upon health in patients with hand condition and would help to optimize patient-oriented care.

The second part of this doctoral thesis contributes to our knowledge the most essential areas of functioning in individuals with hand conditions. A set of ICF categories that contributes most to variation in patients' general health was identified. These ICF categories should be considered in clinical research and practice as they differentiate between the levels of general health after experiencing a hand injury or hand condition. The results of the second part of this doctoral thesis, support the demand for a more systematically consideration of mental functions and environmental factors in clinical research, which has been concluded in the first part of this doctoral thesis. It further could be shown, that the statistical selection of ICF categories covers more than half of an expert driven selection, as provided by the Brief ICF Core Set for Hand Conditions. Thus, the results of the study emphasize, that in clinical practice the Brief ICF Core Set for Hand Conditions should remain the basic instrument to describe functioning in patients with hand conditions. However, it should be complemented by the statistically identified set of ICF categories, especially when following patients over time.

Overall, this doctoral thesis demonstrates that functioning is at the core of the experience in individuals with hand conditions. Hand conditions affect a patient's functioning and health in an extensive way and even though they are sufficiently common, their consequences are often underestimated in clinical

practice. Clinicians typically focus on the impairments of body functions and body structures overlooking, for example, psychological aspects, day-to-day life situations and an individual's environment. The results of this doctoral thesis reveal that mental function aspects have been largely disregarded in scientific research on hand conditions. At the same time, however, it could be shown that mental functions, such as emotional functions or sleep functions, substantially contribute to a person's general health. The impact of hand conditions on patient's functioning and health is complex, thus, including mental function aspects is crucial for an integrated understanding of patients' needs. Further, this work highlights that a patient's physical, social and attitudinal environment deserves more systematically consideration in clinical research. There are considerable gaps in the scientific literature on hand conditions regarding this issue. Clinicians need to be aware of the facilitating or limiting impact of the environment on patient's functioning to be able to adjust patient treatment accordingly and consequently to optimize patient-oriented care.

8 References

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9 List of abbreviations

AHFT	Arthritis Hand Function Test
BCTQ	Boston Carpal Tunnel Questionnaire
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CTS	Carpal tunnel syndrome
CUE	Capabilities of Upper Extremity Instrument
DASH	Disabilities of the Arm Shoulder and Hand Questionnaire
DGUV	Deutsche Gesetzliche Unfallversicherung
HAMIS	Hand Mobility in Scleroderma Test
ICF	International Classification of Functioning, Disability and Health
ICD	International Statistical Classification of Diseases and Related Health Problems
JHFT	Jebson Taylor Hand Function Test
MEDLINE	Medical Literature Analysis and Retrieval System Online
MESH	Medical Subject Headings
MHQ	Michigan Hand Outcomes Questionnaire
nc	not classified
nd	not defined
pf	Personal Factors
PRWE	Patient Rated Wrist Evaluation
PEDRO	Physiotherapie Evidenz Datenbank
SD	Standard deviation
VAS	Visual analogue scale
WHO	World Health Organization

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11 Appendix

Appendix 1:

ICF Core Sets for Hand Conditions

Comprehensive ICF Core Set for Hand Conditions:

ICF Code	Title
b134	Sleep functions
b152	Emotional functions
b1801	Body image
b260	Proprioceptive function
b265	Touch function
b2700	Sensitivity to temperature
b2701	Sensitivity to vibration
b2702	Sensitivity to pressure
b2703	Sensitivity to a noxious stimulus
b280	Sensation of pain
b415	Blood vessel functions
b7100	Mobility of a single joint
b7101	Mobility of several joints
b715	Stability of joint functions
b720	Mobility of bone functions
b7300	Power of isolated muscles and muscle groups
b7301	Power of muscles of one limb
b735	Muscle tone functions
b740	Muscle endurance functions
b760	Control of voluntary movement functions
b765	Involuntary movement functions
b780	Sensations related to muscles and movement functions
b810	Protective functions of the skin
b820	Repair functions of the skin
b830	Other functions of the skin
b840	Sensation related to the skin
b860	Functions of nails
s120	Spinal cord and related structures
s410	Structure of cardiovascular system
s710	Structure of head and neck region
s720	Structure of shoulder region
s7300	Structure of upper arm
s7301	Structure of forearm
s7302	Structure of hand
s770	Additional musculoskeletal structures related to movement
s810	Structure of areas of skin
s830	Structure of nails
d170	Writing
d230	Carrying out daily routine
d360	Using communication devices and techniques

ICF Code	Title
d410	Changing basic body position
d430	Lifting and carrying objects
d4400	Picking up
d4401	Grasping
d4402	Manipulating
d4403	Releasing
d4408	Fine hand use, other specified
d4450	Pulling
d4451	Pushing
d4452	Reaching
d4453	Turning or twisting the hands or arms
d4454	Throwing
d4455	Catching
d4458	Hand and arm use, other specified
d455	Moving around
d465	Moving around using equipment
d470	Using transportation
d475	Driving
d510	Washing oneself
d520	Caring for body parts
d530	Toileting
d540	Dressing
d550	Eating
d560	Drinking
d570	Looking after one's health
d620	Acquisition of goods and services
d630	Preparing meals
d640	Doing housework
d650	Caring for household objects
d660	Assisting others
d7	Interpersonal interactions and relationships
d810 - d839	Education
d840 - d859	Work and employment
d920	Recreation and leisure
e110	Products or substances for personal consumption
e115	Products and technology for personal use in daily living
e120	Products and technology for personal indoor and outdoor mobility and transportation
e125	Products and technology for communication
e130	Products and technology for education
e135	Products and technology for employment
e140	Products and technology for culture, recreation and sport
e150	Design, construction and building products and technology of buildings for public use

ICF Code	Title
e155	Design, construction and building products and technology of buildings for private use
e165	Assets
e225	Climate
e310	Immediate family
e315	Extended family
e320	Friends
e325	Acquaintances, peers, colleagues, neighbours and community members
e330	People in positions of authority
e335	People in subordinate positions
e340	Personal care providers and personal assistants
e345	Strangers
e355	Health professionals
e360	Other professionals
e410	Individual attitudes of immediate family members
e420	Individual attitudes of friends
e425	Individual attitudes of acquaintances, peers, colleagues, neighbours and community members
e430	Individual attitudes of people in positions of authority
e440	Individual attitudes of personal care providers and personal assistants
e445	Individual attitudes of strangers
e450	Individual attitudes of health professionals
e455	Individual attitudes of other professionals
e460	Societal attitudes
e465	Social norms, practices and ideologies
e525	Housing services, systems and policies
e530	Utilities services, systems and policies
e535	Communication services, systems and policies
e540	Transportation services, systems and policies
e550	Legal services, systems and policies
e555	Associations and organizational services, systems and policies
e570	Social security services, systems and policies
e575	General social support services, systems and policies
e580	Health services, systems and policies
e585	Education and training services, systems and policies
e590	Labour and employment services, systems and policies

Brief ICF Core Set for Hand Conditions:

ICF Code	Title
b152	Emotional functions
b265	Touch function
b270	Sensory functions related to temperature and other stimuli
b280	Sensation of pain
b710	Mobility of joint functions
b715	Stability of joint functions
b730	Muscle power functions
b760	Control of voluntary movement functions
b810	Protective functions of the skin
s120	Spinal cord and related structures
s720	Structure of shoulder region
s730	Structure of upper extremity
d230	Carrying out daily routine
d430	Lifting and carrying objects
d440	Fine hand use
d445	Hand and arm use
d5	Self-care
d6	Domestic life
d7	Interpersonal interactions and relationships
d840 - d859	Work and employment
e1	Products and technology
e3	Support and relationships
e5	Services, systems and policies

Appendix 2:

Study I – Search strategy applied in the systematic literature review

Search terms applied in the electronic literature databases MEDLINE, Embase, PsycINFO, CINAHL, and PEDro:

(finger* in ti,ab) or (wrist in ti, ab) or (forearm in ti,ab) or (hands in ti, ab) or (hand in ti, ab)
(muscle* or ligament* or bone* or tissue* or tendon*) in ti, ab
(forearm* or wrist* or hand* or finger* or trapez* or hamate* or capitate* or scaphoid* or lunate* or triquetral* or pisiform* or metacarpal* or radius or ulna) in ti,ab
(fractur* or rupture* or lesion* or amputat* or injur* or torn or dislocate* or wound* or tear* luxation* or laceration* or sublux* or repair* or reconstruct* or graft* or suture or scar) in ti,ab
explode hand injuries/ all subheadings
explode arm injuries/ all subheadings
explode soft tissue injuries/ all subheadings
explode tendon injuries/ all subheadings
explode Dislocations/ all subheadings
(hand near4 injur*) in ti,ab
(hand near4 therap*) in ti,ab
(hand near4 rehabilitation*) in ti,ab
(hand near4 surger*) in ti,ab
(hand near4 disorder*) in ti,ab
(hand near4 function*) in ti,ab
trauma disorder* in ti, ab
sprains and (strains in ti, ab)
amputat* in ti, ab
orthopaedic prosth* in ti,ab
accidental fall* in ti, ab
athletic injur* in ti,ab
sport injur* in ti,ab

Appendix 3:

Study I – Studies analysed in the systematic review

#	AUTHOR	TITLE	SOURCE
1	Abramo A; Tagil M; Geijer M. et al.	Osteotomy of dorsally displaced malunited fractures of the distal radius: no loss of radiographic correction during healing with a minimally invasive fixation technique and an injectable bone substitute	Acta Orthopaedica. 2008 Apr; 79(2): 262 8.
2	Adams BD; Grosland NM; Murphy DM. et al.	Impact of Impaired Wrist Motion on Hand and Upper-Extremity Performance	J-Hand-Surg-(USA). Journal-of-Hand-Surgery. 2003; 28(6): 898-903
3	Allanore Y; Seror R; Chevrot A.; et al.	Hand vascular involvement assessed by magnetic resonance angiography in systemic sclerosis	Arthritis & Rheumatism. 2007 Aug; 56(8): 2747 54.
4	Alnot JY; Muller GP.	A retrospective review of 115 cases of surgically-treated trapeziometacarpal osteoarthritis	Rev-Rhum-Engl-Ed. Revue-du-Rhumatisme-(English-Edition). 1998; 65(2): 95-108
5	Alon G; Levitt Af; McCarthy PA.	Functional electrical stimulation enhancement of upper extremity functional recovery during stroke rehabilitation: a pilot study	Neurorehabilitation and Neural Repair 2007 May Jun;21(3):207 215
6	Alon G; Sunnerhagen KS; Geurts ACH. et al.	A home-based, self-administered stimulation program to improve selected hand functions of chronic stroke	NeuroRehabilitation. 2003; 18(3): 215 25. (39 ref)
7	Al-Qattan MM; Al-Zahrani K.	Open reduction and cerclage wire fixation for long oblique/spiral fractures of the proximal phalanx of the fingers	J-Hand-Surg-Eur-Vol. Journal-of-Hand-Surgery:-European-Volume. 2008; 33(2): 170-173
8	Al-Qattan MM; Pitkanen J.	Delayed primary excision and grafting of full thickness alkali burns of the hand and forearm	Burns. 2001 Jun
9	Armagan O; Tascioglu F; Oner C.	Electromyographic biofeedback in the treatment of the hemiplegic hand: a placebo-controlled study	American Journal of Physical Medicine & Rehabilitation 2003 Nov;82(11):856 861
10	Arnold G; Boone KB; Lu P. et al.	Sensitivity and Specificity of Finger Tapping Test Scores for the Detection of Suspect Effort	Clinical-Neuropsychologist. Vol 19(1) Feb 2005, 105-120.
11	Atroshi I; Brogren E; Larsson G. et al.	Wrist-bridging versus non-bridging external fixation for displaced distal radius fractures: a randomized assessor-blind clinical trial of 38 patients followed for 1 year	Acta Orthopaedica. 2006 Jun; 77(3): 445 53. (22 ref)
12	Azzopardi T; Ehrendorfer S; Coulton T. et al.	Unstable extra-articular fractures of the distal radius	J-Bone-Jt-Surg-Ser-B. Journal-of-Bone-and-Joint-Surgery-Series-B. 2005; 87(6): 837-840
13	Baumgarten KM; Gerlach D; Boyer ML.	Corticosteroid injection in diabetic patients with trigger finger: a prospective, randomized, controlled double-blinded study	Journal of Bone and Joint Surgery (American). 2007 Dec; 89A(12): 2604 11. (16 ref)
14	Beaumer A; McQueen MM.	Fractures of the distal radius in low-demand elderly patients: closed reduction of no value in 53 of 60 wrists	Acta Orthopaedica Scandinavica. 2003 Feb; 74(1): 98 100. (11 ref)
15	Beekhuizen KS; Field Fote EC.	Massed practice versus massed practice with stimulation: effects on upper extremity function and cortical plasticity in individuals with incomplete cervical spinal cord injury	Neurorehabilitation and Neural Repair 2005 Mar;19(1):33 45
16	Belcher HJ; Pandya AN.	Centro-central union for the prevention of neuroma formation after finger amputation	J-Hand-Surg-[Br]. 2000 Apr
17	Bertelli JA; Peruchi FM; Rost JR. et al.	Treatment of scaphoid non-unions by a palmar approach with vascularised bone graft harvested from the thumb	J-Hand-Surg-(GBR). Journal-of-Hand-Surgery. 2007; 32(2): 217-223
18	Bhatia R; Field J; Grote J; Huma H.	Does splintage help pain after carpal tunnel release?	Journal of Hand Surgery British Volume 2000 Apr;25(2):150
19	Bhatt E; Nagpal A; Greer Kh. et al.	Effect of finger tracking combined with electrical stimulation on brain reorganization and hand function in subjects with stroke	Experimental Brain Research 2007 Oct;182(4):435 447
20	Bienek T; Kusz D; Cielinski L.	Peripheral nerve compression neuropathy after fractures of the distal radius	J-Hand-Surg-(GBR). Journal-of-Hand-Surgery. 2006; 31(3): 256-260
21	Bjork MA; Thyberg ISM; Skogh T. et al.	Hand function and activity limitation according to health assessment questionnaire in patients with rheumatoid arthritis and healthy referents: 5-year followup of predictors of activity limitation (The Swedish TIRA Project)	Journal of Rheumatology. 2007 Feb; 34(2): 296 302. (36 ref)
22	Bond CB; Shin Ay; McBride Mt; Dao Kd	Percutaneous screw fixation or cast immobilization for nondisplaced scaphoid fractures	Journal of Bone and Joint Surgery American Volume 2001 Apr;83(4):483 488
23	Brenner P.	Dupuytren's disease of ring and little finger	Orthop-Traumatol. Orthopedics-and-Traumatology. 2002; 10(2): 138-158

#	AUTHOR	TITLE	SOURCE
24	Brininger TL; Rogers JC; Holm MB. et al.	Efficacy of a fabricated customized splint and tendon and nerve gliding exercises for the treatment of carpal tunnel syndrome: a randomized controlled trial	Archives of Physical Medicine and Rehabilitation 2007 Nov;88(11):1429-1435
25	Brogardh C; Sjolund BH.	Constraint-induced movement therapy in patients with stroke: a pilot study on effects of small group training and of extended mitt use [with consumer summary]	Clinical Rehabilitation 2006 Mar;20(3):218-227
26	Brown MT; Couch ME; Huchton DM.	Assessment of donor-site functional morbidity from radial forearm fasciocutaneous free flap harvest	Arch-Otolaryngol-Head-Neck-Surg. Archives-of-Otolaryngology-Head-and-Neck-Surgery. 1999; 125(12): 1371-1374
27	Brunelli GA.	Sensory nerves transfers	J-Hand-Surg-(GBR). Journal-of-Hand-Surgery. 2004; 29(6): 557-562
28	Brunnekreef JJ; Oosterhof J; Thijssen DH. et al.	Forearm blood flow and oxygen consumption in patients with bilateral repetitive strain injury measured by near-infrared spectroscopy	Clin-Physiol-Funct-Imaging. 2006 May
29	Brutus JP; Baeten Y; Chahidi N. et al.	Percutaneous Herbert screw fixation for fractures of the scaphoid: Review of 30 cases	Chir-Main. Chirurgie-de-la-Main. 2002; 21(6): 350-354
30	Bullens PH; Driesprong M; Lacroix H. et al.	Treatment of scaphoid non-union with a percutaneous corticocancellous bone graft	J-Hand-Surg-[Br]. 2005 Aug
31	Burns A; Burrige J; Pickering R. et al.	Does the use of a constraint mitten to encourage use of the hemiplegic upper limb improve arm function in adults with subacute stroke?	Clinical-Rehabilitation. Vol 21(10) Oct 2007, 895-904.
32	Burton CL; Huitsch DF; Strauss E. et al.	Intraindividual variability in physical and emotional functioning: Comparison of adults with traumatic brain injuries and healthy adults	Clinical-Neuropsychologist. Vol 16(3) Aug 2002, 264-279.
33	Buxbaum LJ; Johnson-Frey SH; Bartlett-Williams M.	Deficient internal models for planning hand-object interactions in apraxia	Neuropsychologia-. Vol 43(6) 2005, 917-929.
34	Calandruccio JH; Gelberman RH; Duncan SF. et al.	Capitulate arthrodesis with scaphoid and triquetrum excision	J-Hand-Surg-[Am]. 2000 Sep
35	Caifee RP; Shin SS; Weiss APC.	Neurolysis of the distal superficial radial nerve for dysaesthesia due to nerve tethering	J-Hand-Surg-Eur-Vol. Journal-of-Hand-Surgery:-European-Volume. 2008; 33(2): 152-154
36	Campbell DA.	Open reduction and internal fixation of intra articular and unstable fractures of the distal radius using the AO distal radius plate	J-Hand-Surg-(GBR). Journal-of-Hand-Surgery. 2000; 25 B(6): 528-534
37	Carey JR; Durfee WK; Bhatt E. et al.	Comparison of finger tracking versus simple movement training via telerehabilitation to alter hand function and cortical reorganization after stroke	Neurorehabilitation and Neural Repair 2007 May Jun;21(3):216-232
38	Carey JR; Kimberley TJ; Lewis SM. et al.	Analysis of fMRI and finger tracking training in subjects with chronic stroke	Brain 2002;125(4):773-788
39	Carter PR; Frederick HA; Laseter GF.	Open reduction and internal fixation of unstable distal radius fractures with a low-profile plate: A multicenter study of 73 fractures	J-Hand-Surg-(USA). Journal-of-Hand-Surgery. 1998; 23(2): 300-307
40	Case Smith J.	Outcomes in hand rehabilitation using occupation therapy services	American Journal of Occupational Therapy. 2003 Sep Oct; 57(5): 499-506. (23 ref)
41	Catalano III LW; Cardon L; Patenaude N. et al.	Results of surgical treatment of acute and chronic grade II tears of the radial collateral ligament of the thumb metacarpophalangeal joint	J-Hand-Surg-(USA). Journal-of-Hand-Surgery. 2006; 31(1): 68-75
42	Cauraugh JH; Kim SB.	Stroke motor recovery: active neuromuscular stimulation and repetitive practice schedules	Journal of Neurology, Neurosurgery, and Psychiatry 2003 Nov;74(11):1562-1566
43	Cavadas PC.	Salvage of replanted upper extremities with major soft-tissue complications	J-Plast-Reconstr-Aesthetic-Surg. Journal-of-Plastic,-Reconstructive-and-Aesthetic-Surgery. 2007; 60(7): 769-775
44	Celiker R; Arslan S; Inanici F.	Corticosteroid injection versus nonsteroidal antiinflammatory drug and splinting in carpal tunnel syndrome	American Journal of Physical Medicine & Rehabilitation 2002 Mar;81(3):182-186

#	AUTHOR	TITLE	SOURCE
45	Celikoz B; Achauer BM; VanderKam VM.	Hot-press hand burn treatment	Journal of Burn Care & Rehabilitation. 1998 Mar Apr; 19(2): 128 30. (11 ref)
46	Cetinus E; Buyukbese MA; Uzel M. et al.	Hand grip strength in patients with type 2 diabetes mellitus	Diabetes Research and Clinical Practice. 2005 Dec; 70(3): 278 86. (34 ref)
47	Chae J; Bethoux F; Bohine T. et al.	Neuromuscular stimulation for upper extremity motor and functional recovery in acute hemiplegia	Stroke 1998 May;29(5):975 979
48	Challis MJ; Jull GJ; Stanton WR. et al.	Cyclic pneumatic soft-tissue compression enhances recovery following fracture of the distal radius: a randomised controlled trial	Australian Journal of Physiotherapy 2007;53(4):247 252
49	Chang B; Huang B; Chou C. et al.	A new type of chopsticks for patients with impaired hand function	Archives of Physical Medicine and Rehabilitation. 2006 Jul; 87(7): 1013 5. (5 ref)
50	Chen C; Chen H; Cheng P. et al.	Enhancement of operational efficiencies for people with high cervical spinal cord injuries using a flexible integrated pointing device apparatus	Archives of Physical Medicine and Rehabilitation. 2006 Jun; 87(6): 866 73. (27 ref)
51	Christensen OM; Kunov A; Hansen FF. et al.	Occupational therapy and Colles' fractures	International Orthopaedics 2001 Apr;25(1):43 45
52	Christodoulou L; Melikyan EY; Woodbridge S. et al.	Functional outcome of high-pressure injection injuries of the hand	Journal of Trauma. 2001 Apr; 50(4): 717 20. (15 ref)
53	Clark DJ; Delaney R; Stilwell JH. et al.	The value of crossed intrinsic transfer after metacarpophalangeal silastic arthroplasty: a comparative study	J-Hand-Surg-[Br]. 2001 Dec
54	Cooper C; Evidente VGH; Hentz JG. et al.	The effect of temperature on hand function in patients with tremor	Journal of Hand Therapy. 2000 Oct Dec; 13(4): 276 88. (17 ref)
55	Courtman NH; Sochart DH; Trail I A. et al.	Biaxial wrist replacement	J-Hand-Surg-(GBR). Journal-of-Hand-Surgery. 1999; 24 B(1): 32-34
56	Daly JJ; Hogan N; Perepezko EM. et al.	Response to upper-limb robotics and functional neuromuscular stimulation following stroke	Journal of Rehabilitation Research and Development 2005 Nov Dec;42(6):723 736
57	Davey PA; Simonis RB.	Modification of the Nicoll bone-grafting technique for nonunion of the radius and/or ulna	Journal of Bone and Joint Surgery (British). 2002 Jan; 84B(1): 30 3. (8 ref)
58	Davis TR; Brady O; Dias JJ.	Excision of the trapezium for osteoarthritis of the trapeziometacarpal joint: a study of the benefit of ligament reconstruction or tendon interposition	J-Hand-Surg-[Am]. 2004 Nov
59	de Jong LD; Nieuwboer A; Aufdemkampe G.	Contracture preventive positioning of the hemiplegic arm in subacute stroke patients: a pilot randomized controlled trial [with consumer summary]	Clinical Rehabilitation 2006 Aug;20(8):656 667
60	de Kroon JR; Mj Ij; Lankhorst GJ. et al.	Electrical stimulation of the upper limb in stroke: stimulation of the extensors of the hand versus alternate stimulation of flexors and extensors	American Journal of Physical Medicine & Rehabilitation 2004 Aug;83(8):592 600
61	de-Berker D; Lawrence C.	Ganglion of the distal interphalangeal joint (myxoid cyst): therapy by identification and repair of the leak of joint fluid	Arch-Dermatol. 2001 May
62	Del-Pinal F; Herrero F; Jado E. et al.	Acute hand compartment syndromes after closed crush: a reappraisal	Plast-Reconstr-Surg. 2002 Oct
63	Desrosiers J; Bourbonnais D; Corriveau H. et al.	Effectiveness of unilateral and symmetrical bilateral task training for arm during the subacute phase after stroke: a randomized controlled trial [with consumer summary]	Clinical Rehabilitation 2005 Sep;19(6):581 593
64	Dijkerman HC; Ietswaart M; Johnston M. et al.	Does motor imagery training improve hand function in chronic stroke patients? A pilot study	Clinical Rehabilitation. 2004 Aug; 18(5): 538 49. (30 ref)
65	Dolan P; Torgerson D; Kakarlapud TK.	Health-related quality of life of Colles fracture patients	Osteoporosis-Int. Osteoporosis-International. 1999; 9(3): 196-199
66	Durmus A; Cakmak A; Disci R. et al.	The efficiency of electromagnetic field treatment in Complex Regional Pain Syndrome Type I	Disability and Rehabilitation. 2004 May 6; 26(9): 537 45. (49 ref)
67	Duval C; Panisset M; Strafella AP. et al.	The impact of ventrolateral thalamotomy on tremor and voluntary motor behavior in patients with Parkinson's disease	Experimental-Brain-Research. Vol 170(2) Apr 2006, 160-171.

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68	Egol KA; Paksima N; Puopolo S. et al.	Treatment of external fixation pins about the wrist: a prospective, randomized trial	Journal of Bone and Joint Surgery (American). 2006 Feb; 88A(2): 349-54.
69	Elsinger CL; Rao SM; Zimelman JL. et al.	Neural basis for impaired time reproduction in Parkinson's disease: An fMRI study	Journal-of-the-International-Neuropsychological-Society. Vol 9(7) Nov 2003, 1088-1098.
70	Ergun M; Emertcan AT; Ozturkcan S. et al.	Sexual dysfunction in patients with chronic hand eczema in the Turkish population	Journal-of-Sexual-Medicine. Vol 4(6) Nov 2007, 1684-1690.
71	Fasoli SE; Krebs HI; Stein J. et al.	Effects of robotic therapy on motor impairment and recovery in chronic stroke	Archives of Physical Medicine and Rehabilitation 2003 Apr;84(4):477-482
72	Fawzy EA; Kateros KT; Papagelopoulos PJ. et al.	Open reduction and internal fixation of distal radial fractures using the Pi-plate	Injury. 2005 Feb
73	Ferris BL; Taylor LM Jr; Oyama K. et al.	Hypothenar hammer syndrome: proposed etiology	J-Vasc-Surg. 2000 Jan
74	Field T; Diego M; Hernandez Reif M. et al.	Hand arthritis pain is reduced by massage therapy	Journal of Bodywork & Movement Therapies 2007 Jan;11(1):21-24
75	Finsen V; Andersen K; Russwurm H.	No advantage from splinting the wrist after open carpal tunnel release. A randomized study of 82 wrists	Acta Orthopaedica Scandinavica 1999 Jun;70(3):288-292
76	Forward D; Lindau TR; Melsom DS.	Intercarpal ligament injuries associated with fractures of the distal part of the radius	Journal of Bone and Joint Surgery (American). 2007 Nov; 89A(11): 2334-40. (26 ref)
77	Francisco GE; Boake C; Vaughn A.	Botulinum toxin in upper limb spasticity after acquired brain injury: a randomized trial comparing dilution techniques	American Journal of Physical Medicine & Rehabilitation. 2002 May; 81(5): 355-63. (26 ref)
78	Franzblau A; Armstrong TJ; Werner RA. et al.	A cross-sectional assessment of the ACGIH TLV for hand activity level	J-Occup-Rehabil. Journal-of-Occupational-Rehabilitation. 2005; 15(1): 57-67
79	Freedman DM; Eaton RG; Glickel SZ.	Long-term results of volar ligament reconstruction for symptomatic basal joint laxity	J-Hand-Surg-(USA). Journal-of-Hand-Surgery. 2000; 25(2): 297-304
80	Fu Y; Chien S; Huang P. et al.	Use of an external fixation combined with the buttress-maintain pinning method in treating comminuted distal radius fractures in osteoporotic patients	Journal of Trauma. 2006 Feb; 60(2): 330-3. (16 ref)
81	Galanakis I; Aligizakis A; Katonis P. et al.	Treatment of closed unstable metacarpal fractures using percutaneous transverse fixation with Kirschner wires	Journal of Trauma. 2003 Sep; 55(3): 509-13. (20 ref)
82	Garcia Elias M; Lluch A; Ferreres A. et al.	Treatment of radiocarpal degenerative osteoarthritis by radioscapulohumeral arthrodesis and distal scaphoidectomy	J-Hand-Surg-(USA). Journal-of-Hand-Surgery. 2005; 30(1): 8-15
83	Garcia-Lopez A; Perez-Ubeda MJ; Marco F. et al.	A modified technique of four-bone fusion for advanced carpal collapse (SLAC/SNAC wrist)	J-Hand-Surg-[Br]. 2001 Aug
84	Gaulke R; Suppela G.	Solitary enchondroma at the hand. Long-term follow-up study after operative treatment	J-Hand-Surg-(GBR). Journal-of-Hand-Surgery. 2004; 29 B(1): 64-66
85	Gerostathopoulos N; Kalliakmanis A; Fandridis E. et al.	Trimed fixation system for displaced fractures of the distal radius	Journal of Trauma. 2007 Apr; 62(4): 913-8. (31 ref)
86	Geritsen AA; de Vet HC; Scholten RJ. et al.	Splinting versus surgery in the treatment of carpal tunnel syndrome: a randomized controlled trial	JAMA 2002 Sep 11;288(10):1245-1251
87	Goldfarb CA; Gelberman RH; McKeon K. et al.	Extra-Articular Steroid Injection: Early Patient Response and the Incidence of Flare Reaction	J-Hand-Surg-(USA). Journal-of-Hand-Surgery. 2007; 32(10): 1513-1520
88	Goldfarb CA; Stern PJ.	Metacarpophalangeal joint arthroplasty in rheumatoid arthritis: a long-term assessment	Journal of Bone and Joint Surgery (American). 2003 Oct; 85A(10): 1869-78. (20 ref)
89	Goris RJ; Leixnering M; Huber W. et al.	Delayed recovery and late development of complex regional pain syndrome in patients with an isolated fracture of the distal radius: PREDICTION OF A REGIONAL INFLAMMATORY RESPONSE BY EARLY SIGNS	Journal of Bone and Joint Surgery (British). 2007 Aug; 89B(8): 1069-76. (40 ref)

#	AUTHOR	TITLE	SOURCE
90	Goslings JC; Broekhuizen AH; Boxma H. et al.	Three-dimensional dynamic external fixation of distal radial fractures. A prospective study	Injury. 1999 Aug
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Appendix 4:

Case record form applied in the cross-sectional study

Case Record Form - HP

Empirische Validierungsstudie

Erhebungsbogen für Gesundheitsfachberufe

Ausfülldatum:

--	--	--	--	--	--	--	--

Bitte hier Etikett aufkleben!

Patienten-Nummer

BITTE BEACHTEN SIE FOLGENDES:

- Bitte benutzen Sie zum Ausfüllen des Erhebungsbogens einen Kugelschreiber.
- Beantworten Sie bitte **alle** Fragen.
- Bitte schreiben Sie in Druckbuchstaben.
- Falls Ihnen ein Fehler beim Ausfüllen unterlaufen ist, streichen Sie diesen wie unten durch und notieren Sie anschließend die richtige Antwort.

Beispiel:

Ja Nein

- Wenn Sie ein Datum angeben, füllen Sie bitte so viele Zellen wie möglich aus.

Beispiel:

2	1	0	9	1	9	5	0
T		M		J			

		0	9	1	9	5	0
T		M		J			

				1	9	5	0
T		M		J			

Einschlusskriterien

	Ja	Nein
• Bestehende Verletzung / Erkrankung der Hand / Erkrankung andere Ursprungs, welche sich auf die Hand auswirkt	<input type="checkbox"/>	<input type="checkbox"/>
• Alter ≥ 18.....	<input type="checkbox"/>	<input type="checkbox"/>
• Die/der Patientin/Patient wurde über die Ziele und Gründe der Studie aufgeklärt und diese wurden von der/dem Patientin/en verstanden	<input type="checkbox"/>	<input type="checkbox"/>
• Es liegt eine unterschriebene Einverständniserklärung der/des Patientin/en vor.....	<input type="checkbox"/>	<input type="checkbox"/>
• Es lag vor der Verletzung / Erkrankung der Hand keine psychische Erkrankung bei der/dem Patientin/en vor	<input type="checkbox"/>	<input type="checkbox"/>

Angaben zur Berufstätigkeit der Gesundheitsfachkraft

Bitte geben Sie in den folgenden Zeilen Ihre aktuelle Berufsbezeichnung an:

- Arzt / Ärztin
- Krankenpfleger / Krankenpflegerin
- Physiotherapeut/in
- Ergotherapeut/in.....
- Psychologe/in.....
- Sozialarbeiter/in
- Anderes: _____

Die/Der Patient/in ist derzeit:

- ambulant
- stationär

Soziodemografische Angaben

Alter des Patienten: *nicht* _____ *bekannt...*

Geschlecht: männlich... weiblich...

Derzeitiger Familienstand (bitte das am ehesten zutreffende ankreuzen):

ledig/nie verheiratet geschieden
 derzeit verheiratet verwitwet
 getrennt lebend Lebensgemeinschaft
nicht bekannt

Derzeitige Lebenssituation:

Lebt der/die Patient/in alleine? Ja... Nein... *nicht bekannt...*

Höchster Schulabschluss (abgeschlossene Schulbildung):

keine formale Schulbildung höhere Schule abgeschlossen
 weniger als Hauptschule (Fach-)Hochschule abgeschlossen
 Hauptschule abgeschlossen postgraduierter Abschluss
 Real-/Mittelschule abgeschlossen
Schulabschluss nicht bekannt

Jahre der offiziellen Bildung*: _____ *nicht bekannt...*

*Grundschule, Hauptschule/Gymnasium/Realschule, Lehre, (Fach)Hochschule

Derzeitige Tätigkeit:

Bezahlte Arbeit Hausfrau/Hausmann
 Selbstständigkeit Rentner
 Erwerbslosigkeit (gesundheitl. Grund) Schüler/Student
 Erwerbslosigkeit (anderer Grund) Andere Tätigkeit
 (bitte angeben) _____
Tätigkeit nicht bekannt

Berufsbedingte Belastung der Hand:

schwere Belastung
 Vibrationsbelastung
 Präzisionsarbeit
 Bürotätigkeit
Belastung nicht bekannt

Krankheitsspezifische Angaben

Eintritt der Verletzung bzw. Erkrankung der Hand:

Verletzungs-/ Erkrankungsdatum:

--	--	--	--	--	--	--

T

M

J

nicht bekannt...

Händigkeit:

Rechtshänder

Linkshänder

Betroffene Seite:

rechte Hand

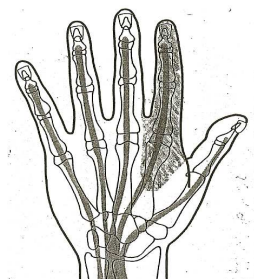
linke Hand

beide Hände

wenn ja,

stärker betroffene Seite: rechte Hand...

linke Hand...



linke Hand

Hauptdiagnose linke Hand:

Es handelt sich bei der Hauptdiagnose um,

- ...eine Verletzung und / oder Erkrankung der Hand

_____ (ICD-10)

_____ (ICD-10)

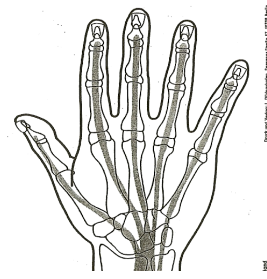
_____ (ICD-10)

- ...eine Erkrankung anderen Ursprungs, welche sich auf die Hand auswirkt

_____ (ICD-10)

_____ (ICD-10)

_____ (ICD-10)



rechte Hand

Hauptdiagnose rechte Hand:

Es handelt sich bei der Hauptdiagnose um,

- ...eine Verletzung und / oder Erkrankung der Hand

_____ (ICD-10)

_____ (ICD-10)

_____ (ICD-10)

- ...eine Erkrankung anderen Ursprungs, welche sich auf die Hand auswirkt

_____ (ICD-10)

_____ (ICD-10)

_____ (ICD-10)

Operation(en)

Wie viele Operationen wurden an der Hand bzw. den Händen durchgeführt?

keine Operation.....

_____ Operation /-en OP-Datum: letzte OP

vorletzte OP

weitere OP

T M J

Art der Operation(en): _____

nicht bekannt

Handkraft linke Hand:

mit Vigorimeter (nach Martin) _____ bar

Handkraft rechte Hand:

mit Vigorimeter (nach Martin) _____ bar

Spitzgriff Daumen und

Zeigefinger linke Hand: _____ bar / kg

(bitte zutreffende Maßeinheit einkreisen)

Spitzgriff Daumen und

Zeigefinger rechte Hand: _____ bar / kg

(bitte zutreffende Maßeinheit einkreisen)

Schlüsselgriff linke Hand: _____ bar / kg

(bitte zutreffende Maßeinheit einkreisen)

Schlüsselgriff rechte Hand: _____ bar / kg

(bitte zutreffende Maßeinheit einkreisen)

***UMFASSENDES
ICF CORE SET DER HAND***

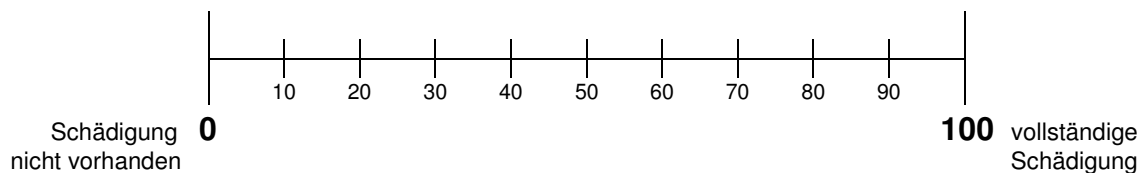
KÖRPERFUNKTIONEN

Bitte bewerten Sie das Ausmaß der Schädigung der auf den folgenden Seiten aufgelisteten KÖRPERFUNKTIONEN der/des Patientin/en unter Berücksichtigung aller erhobenen anamnestischen und diagnostischen Informationen (aus der Krankenakte).

Körperfunktionen sind die physiologischen Funktionen von Körpersystemen (einschließlich psychische Funktionen).

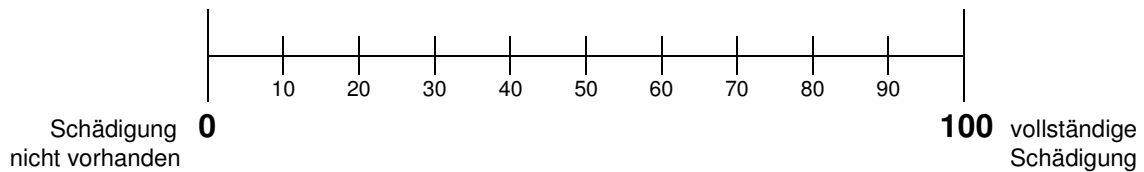
Schädigungen sind Beeinträchtigungen einer Körperfunktion im Sinn einer wesentlichen Abweichung oder eines Verlustes.

Mittels der Visuellen Analogskala (VAS) ist das Ausmaß der Schädigungen der Körperfunktionen zu beurteilen.



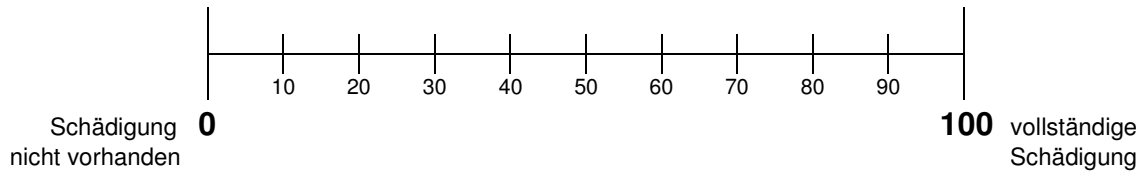
- 0 – Schädigung nicht vorhanden
(die Person hat keine Beeinträchtigung in dieser Körperfunktion)
- 100 – Vollständige Schädigung
(die Person hat eine komplette Beeinträchtigung in dieser Körperfunktion, d.h. dass ein Problem zu 100% der Zeit mit einer Intensität vorliegt, die die tägliche Lebensführung der Person vollständig unterbricht und das täglich in den letzten 30 Tagen auftrat)
- 8 – Nicht spezifiziert
(eine Schädigung liegt vor, die Informationen sind aber unzureichend, um einen Schweregrad anzugeben)
- 9 – Nicht anwendbar
(die Angabe eines Codes ist unangebracht, z.B. b650 Menstruationsfunktionen bei Frauen in der Prämenstruationsphase oder Post-Menopause)
- C – Komorbidität
(das beurteilte Problem hängt ausschließlich mit einer Komorbidität zusammen und nicht mit der Verletzung / Erkrankung der Hand)
- K.I. – Keine Information
(es liegt keine Information vor, um diese Kategorie zu beurteilen)

VAS zur Beurteilung des Ausmaßes der Schädigung der Körperfunktionen:



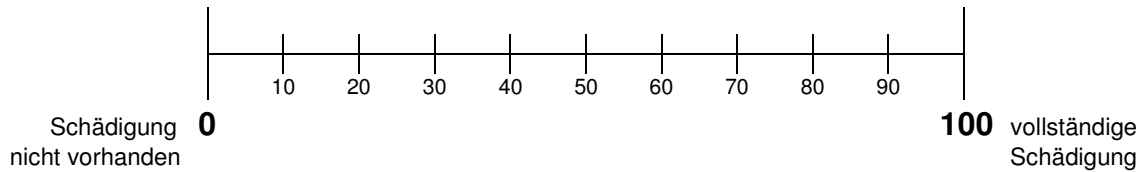
b1	MENTALE FUNKTIONEN				
<u>b134</u>	Funktionen des Schlafes Allgemeine mentale Funktionen, die sich in einer periodischen, reversiblen und selektiven physischen und mentalen Loslösung von der unmittelbaren Umgebung äußern, und die von charakteristischen physiologischen Veränderungen begleitet sind	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.
<u>b152</u>	Emotionale Funktionen Spezifische mentale Funktionen, die im Zusammenhang mit Gefühlen und den affektiven Komponenten von Bewusstseinsprozessen stehen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.
<u>b180</u>	Die Selbstwahrnehmung und die Zeitwahrnehmung betreffende Funktionen				
b1801	Körperschema Spezifische mentale Funktionen, die im Zusammenhang mit dem Bild und dem Bewusstsein des eigenen Körpers stehen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.
b2	SINNESFUNKTIONEN UND SCHMERZ				
<u>b260</u>	Die Propriozeption betreffende Funktionen Sinnesfunktionen, die die Wahrnehmung der Position der einzelnen Körperteile in Relation zum Körper betreffen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.
<u>b265</u>	Funktionen des Tastens (Tastsinn) Sinnesfunktionen, die das Erkennen von Oberflächen sowie deren Beschaffenheit oder Qualität betreffen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.
<u>b270</u>	Sinnesfunktionen bezüglich Temperatur und anderer Reize				
b2700	Temperaturempfinden Sinnesfunktionen, die die Wahrnehmung von kalt und heiß betreffen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.
b2701	Vibrationsempfinden Sinnesfunktionen, die die Wahrnehmung von Erschütterungen oder Schwingungen betreffen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.
b2702	Druck- und Berührungsempfinden Sinnesfunktionen, die die Wahrnehmung von Druck auf der Haut betreffen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.
b2703	Wahrnehmung schädlicher Reize Sinnesfunktionen, die die Wahrnehmung schmerzhafter oder unangenehmer Reize betreffen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.
<u>b280</u>	Schmerz Empfinden eines unangenehmen Gefühls, das mögliche oder tatsächliche Schäden einer Körperstruktur anzeigt	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/> k.I.

VAS zur Beurteilung des Ausmaßes der Schädigung der Körperfunktionen:



b4		FUNKTIONEN DES KARDIOVASKULÄREN, HÄMATOLOGISCHEN, IMMUN- UND ATMUNGSSYSTEMS	
b415	Blutgefäßfunktionen Funktionen, die den Bluttransport durch den Körper betreffen	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b7		NEUROMUSKULOSKELETALE UND BEWEGUNGSBEZOGENE FUNKTIONEN	
b710		Funktionen der Gelenkbeweglichkeit	
b7100	Beweglichkeit eines einzelnen Gelenkes Funktionen, die den Bewegungsumfang und die Leichtigkeit der Bewegung eines einzelnen Gelenkes betreffen	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b7101	Beweglichkeit mehrerer Gelenke Funktionen, die den Bewegungsumfang und die Leichtigkeit der Bewegung mehrerer Gelenke betreffen	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b715	Funktionen der Gelenkstabilität Funktionen, die die Aufrechterhaltung der strukturellen Integrität der Gelenke betreffen	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b720	Funktionen der Beweglichkeit der Knochen Funktionen, die den Bewegungsumfang und die Leichtigkeit der Bewegung des Schulterblatts, Beckens sowie der Handwurzel- und Fußwurzelknochen betreffen	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b730	Funktionen der Muskelkraft Funktionen, die im Zusammenhang mit der Kontraktionskraft eines Muskels oder von Muskelgruppen stehen	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b735	Funktionen des Muskeltonus Funktionen, die im Zusammenhang mit dem Ruhetonus der Muskeln und dem Widerstand bei passiver Bewegung stehen	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b740	Funktionen der Muskelausdauer Funktionen, die im Zusammenhang mit der Aufrechterhaltung der Muskelkontraktion über einen geforderten Zeitraum stehen	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b760	Funktionen der Kontrolle von Willkürbewegungen Funktionen, die mit der Kontrolle und Koordination von willkürlichen Bewegungen verbunden sind	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b765	Funktionen der unwillkürlichen Bewegungen Funktionen, die die unbeabsichtigten, nicht- oder halbzielgerichteten unwillkürlichen Kontraktionen von Muskeln oder Muskelgruppen betreffen	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.
b780	Mit den Funktionen der Muskeln und der Bewegung in Zusammenhang stehende Empfindungen Empfindungen, die mit den Muskeln oder Muskelgruppen des Körpers und ihren Bewegungen verbunden sind	<input type="text"/>	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> VAS-Wert <input type="checkbox"/> k.I.

VAS zur Beurteilung des Ausmaßes der Schädigung der Körperfunktionen:



b8	FUNKTIONEN DER HAUT UND DER HAUTANHANGSGEBILDE				
b810	Schutzfunktionen der Haut Funktionen der Haut zum Schutz des Körpers vor schädlichen physikalischen, chemischen und biologischen Einflüssen	<input style="width: 30px; height: 20px;" type="text"/>	8	9	C
		VAS-Wert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		k.I.			
b820	Heilfunktion der Haut Funktionen, die die Heilung von Wunden und anderen Schäden der Haut betreffen	<input style="width: 30px; height: 20px;" type="text"/>	8	9	C
		VAS-Wert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		k.I.			
b830	Andere Funktionen der Haut Funktionen der Haut außer Schutz und Wiederherstellung, wie Kühlen und Schweißabsonderung	<input style="width: 30px; height: 20px;" type="text"/>	8	9	C
		VAS-Wert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		k.I.			
b840	Auf die Haut bezogene Empfindungen Empfindungen im Zusammenhang mit der Haut, wie Juckreiz, brennende und stechende Empfindungen	<input style="width: 30px; height: 20px;" type="text"/>	8	9	C
		VAS-Wert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		k.I.			
b860	Funktionen der Nägel Funktionen, die die Nägel betreffen, wie Schutz, Kratzen und Aussehen	<input style="width: 30px; height: 20px;" type="text"/>	8	9	C
		VAS-Wert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		k.I.			

Zusätzliche relevant **KÖRPERFUNKTIONEN**, die in ein Core Set der Hand aufgenommen werden müssten:

* Relevant im Sinne von notwendig, um die Funktionsfähigkeit und Behinderung umfassend zu beschreiben.

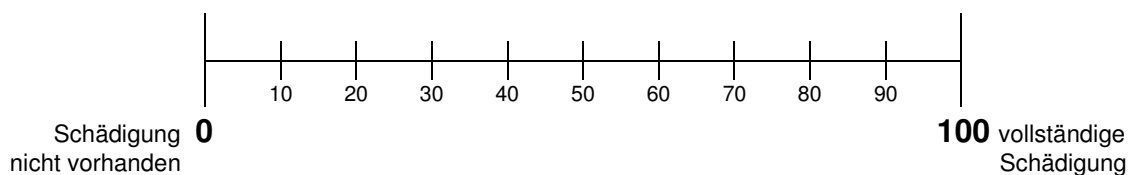
KÖRPERSTRUKTUREN

Bitte bewerten Sie das Ausmaß der Schädigung der unten aufgelisteten KÖRPERSTRUKTUREN der/des Patientin/en unter Berücksichtigung aller erhobenen anamnestischen und diagnostischen Informationen (aus der Krankenakte).

Körperstrukturen sind anatomische Teile des Körpers, wie Organe, Gliedmaßen und ihre Bestandteile.

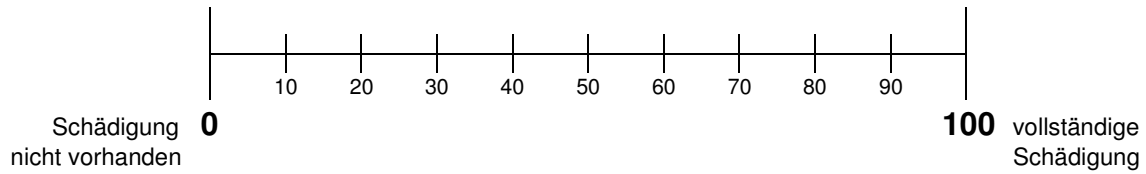
Schädigungen sind Beeinträchtigungen der Struktur im Sinn einer wesentlichen Abweichung oder eines Verlustes.

Mittels der Visuellen Analogskala (VAS) ist das Ausmaß der Schädigungen der Körperstrukturen zu beurteilen.



- 0 – Schädigung nicht vorhanden
(die Person hat keine Beeinträchtigung in dieser Körperstruktur)
- 100 – Vollständige Schädigung
(die Person hat eine komplette Beeinträchtigung in dieser Körperstruktur, d.h. dass ein Problem zu 100% der Zeit mit einer Intensität vorliegt, die die tägliche Lebensführung der Person vollständig unterbricht und das täglich in den letzten 30 Tagen auftrat)
- 8 – Nicht spezifiziert
(eine Schädigung liegt vor, die Informationen sind aber unzureichend, um einen Schweregrad anzugeben)
- 9 – Nicht anwendbar
(die Angabe eines Kodes ist unangebracht, z.B. b650 Menstruationsfunktionen bei Frauen in der Prämenstruationsphase oder Post-Menopause)
- C – Komorbidität
(das beurteilte Problem hängt ausschließlich mit einer Komorbidität zusammen und nicht mit der Verletzung / Erkrankung der Hand)
- K.I. – Keine Information
(es liegt keine Information vor, um diese Kategorie zu beurteilen)

VAS zur Beurteilung des Ausmaßes der Schädigung der Körperstrukturen:



s1	STRUKTUREN DES NERVENSYSTEMS				
s120	Struktur des Rückenmarks und mit ihm in Zusammenhang stehende Strukturen	<input style="width: 40px; height: 20px;" type="text"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
		VAS-Wert	k.I. <input type="checkbox"/>		
s4	STRUKTUREN DES KARDIOVASKULÄREN, DES IMMUN- UND DES ATMUNGSSYSTEMS				
s410	Struktur des kardiovaskulären Systems	<input style="width: 40px; height: 20px;" type="text"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
		VAS-Wert	k.I. <input type="checkbox"/>		
s7	MIT DER BEWEGUNG IN ZUSAMMENHANG STEHENDE STRUKTUREN				
s710	Struktur der Kopf- und Halsregion	<input style="width: 40px; height: 20px;" type="text"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
		VAS-Wert	k.I. <input type="checkbox"/>		
s720	Struktur der Schulterregion	<input style="width: 40px; height: 20px;" type="text"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
		VAS-Wert	k.I. <input type="checkbox"/>		
s730	Struktur der oberen Extremität				
s7300	Struktur des Oberarms	<input style="width: 40px; height: 20px;" type="text"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
		VAS-Wert	k.I. <input type="checkbox"/>		
s7301	Struktur des Unterarms	<input style="width: 40px; height: 20px;" type="text"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
		VAS-Wert	k.I. <input type="checkbox"/>		
s7302	Struktur der Hand	<input style="width: 40px; height: 20px;" type="text"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
		VAS-Wert	k.I. <input type="checkbox"/>		
s8	STRUKTUREN DER HAUT UND HAUTANHANGSGEBILDE				
s810	Struktur der Hautregionen	<input style="width: 40px; height: 20px;" type="text"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
		VAS-Wert	k.I. <input type="checkbox"/>		
s830	Struktur der Nägel	<input style="width: 40px; height: 20px;" type="text"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
		VAS-Wert	k.I. <input type="checkbox"/>		

Zusätzliche relevant **KÖRPERSTRUKTUREN**, die in ein Core Set der Hand aufgenommen werden müssten

* Relevant im Sinne von notwendig, um die Funktionsfähigkeit und Behinderung umfassend zu beschreiben.

AKTIVITÄTEN & PARTIZIPATION [TEILHABE]

Bitte bewerten Sie das Ausmaß der Beeinträchtigung der auf den folgenden Seiten aufgelisteten Aktivitäts- und Partizipationskategorien [Teilhabe] der/des Patientin/en unter Berücksichtigung aller erhobenen anamnestischen und diagnostischen Informationen. Zusätzliche Informationen sind durch direkte Beobachtung und Befragung der/s Patientin/en oder der Angehörige der/s Patientin/en zu erheben.

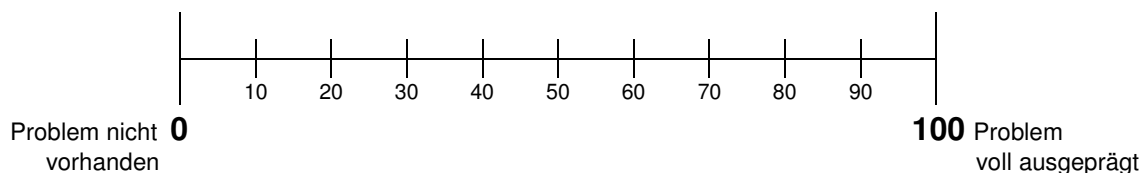
Eine *Aktivität* ist die Durchführung einer Aufgabe oder einer Handlung (Aktion) durch einen Menschen.

Eine *Beeinträchtigung der Aktivität* ist eine Schwierigkeit oder die Unmöglichkeit, die ein Mensch haben kann, die Aktivität auszuführen.

***Partizipation* [Teilhabe] ist das Einbezogensein in eine Lebenssituation.**

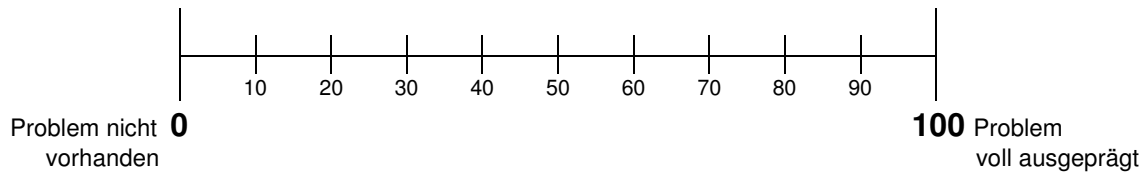
Eine *Beeinträchtigung der Partizipation* [Teilhabe] ist ein Problem, das ein Mensch in Hinblick auf sein Einbezogensein in Lebenssituationen erleben kann.

Mittels der Visuellen Analogskala (VAS) ist das Ausmaß der Beeinträchtigung der Aktivitäts- und Partizipationskategorien zu beurteilen.



- 0 – Problem nicht vorhanden
(die Person hat keine Beeinträchtigung der Aktivität oder der Partizipation)
- 100 – Problem voll ausgeprägt
(die Person hat eine komplette Beeinträchtigung der Aktivität oder der Partizipation, d.h. dass ein Problem zu 100% der Zeit mit einer Intensität vorliegt, die die tägliche Lebensführung der Person vollständig unterbricht und das täglich in den letzten 30 Tagen auftrat)
- 8 – Nicht spezifiziert
(eine Beeinträchtigung liegt vor, die Informationen sind aber unzureichend, um einen Schweregrad anzugeben)
- 9 – Nicht anwendbar
(die Angabe eines Kodes ist unangebracht, z.B. b650 Menstruationsfunktionen bei Frauen in der Prämenstruationsphase oder Post-Menopause)
- C – Komorbidität
(das beurteilte Problem hängt ausschließlich mit einer Komorbidität zusammen und nicht mit der Verletzung / Erkrankung der Hand)

VAS zur Beurteilung des Ausmaßes der Beeinträchtigung der Aktivitäts- und Partizipationskategorien:

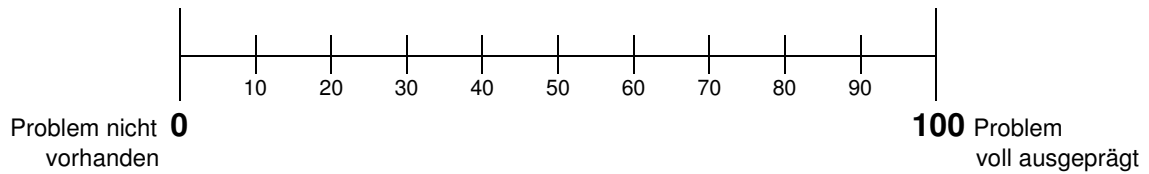


d1	LERNEN UND WISSENSANWENDUNG				
d170	Schreiben Symbole oder Sprache zu verwenden oder zu produzieren, um Informationen zu vermitteln, wie schriftliche Aufzeichnungen von Ereignissen oder Ideen produzieren oder einen Brief entwerfen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
d2	ALLGEMEINE AUFGABEN UND ANFORDERUNGEN				
d230	Die tägliche Routine durchführen Einfache und komplexe und koordinierte Handlungen auszuführen, um die Anforderungen der alltäglichen Prozeduren oder Pflichten zu planen, zu handhaben und zu bewältigen, wie Zeit einplanen und den Tagesplan für die verschiedenen Aktivitäten aufstellen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
d3	KOMMUNIKATION				
d360	Kommunikationsgeräte und -techniken benutzen Kommunikationsgeräte, -techniken und andere Kommunikationsmittel verwenden, wie einen Freund per Telefon anrufen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
d4	MOBILITÄT				
d410	Eine elementare Körperposition wechseln In eine und aus einer Körperposition zu gelangen und sich von einem Ort zu einem anderen zu bewegen, wie von einem Stuhl aufstehen, um sich in ein Bett zu legen, in eine und aus einer knienden oder hockenden Position gelangen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
d420	Sich verlagern Sich von einer Oberfläche auf eine andere zu bewegen, wie auf einer Bank entlang gleiten oder sich ohne Änderung der Körperposition aus dem Bett auf einen Stuhl bewegen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
d430	Gegenstände anheben und tragen Einen Gegenstand anzuheben oder etwas von einem Platz zu einem anderen zu tragen, wie eine Tasse anheben oder ein Kind von einem Zimmer in ein anderes tragen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
d440	Feinmotorischer Handgebrauch				
d4400	Einen Gegenstand aufnehmen Einen kleinen Gegenstand mit den Händen und Fingern aufnehmen oder aufheben, wie einen Bleistift aufnehmen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
d4401	Einen Gegenstand ergreifen Mit beiden Händen etwas ergreifen und halten, wie ein Werkzeug oder einen Türknauf ergreifen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
d4402	Einen Gegenstand handhaben Mit Fingern und Händen die Kontrolle über etwas ausüben, es zu dirigieren oder zu führen, wie mit Münzen oder anderen kleinen Gegenständen hantieren	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>
d4403	Einen Gegenstand loslassen Mit Fingern und Händen etwas loslassen oder freigeben, so dass es fällt oder die Position ändert, wie ein Kleidungsstück fallen lassen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/>	9 <input type="checkbox"/>	C <input type="checkbox"/>

VAS zur Beurteilung des Ausmaßes der Beeinträchtigung der Aktivitäts- und Partizipationskategorien:			
d4408	Feinmotorischer Handgebrauch, anders bezeichnet Mit Daumen und (Zeige-)Finger etwas im Spitz- oder Präzisionsgriff ergreifen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<u>d445</u> Hand- und Armgebrauch			
d4450	Ziehen Einen Gegenstand mit Fingern, Händen und Armen zu sich hinzubringen oder ihn von einem Platz zu einem anderen zu bewegen, wie eine Tür zuziehen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
d4451	Schieben Einen Gegenstand mit Fingern, Händen und Armen von sich wegzubringen oder ihn von einem Platz zu einem anderen zu bewegen, wie ein Tier wegschubsen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
d4452	Nach etwas langen Hände und Arme ausstrecken, um etwas zu berühren und zu greifen, wie über einen Tisch oder Pult nach einem Buch langen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
d4453	Hände oder Arme drehen oder verdrehen Einen Gegenstand mit Fingern, Händen und Armen in Rotation zu versetzen, zu drehen oder zu wenden, wie es für den Gebrauch von Werkzeugen oder Küchenutensilien erforderlich ist	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
d4454	Werfen Etwas mit Fingern, Händen und Armen aufzunehmen und es mit einiger Kraft durch die Luft zu schleudern, wie einen Ball hochwerfen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
d4455	Fangen Einen bewegten Gegenstand mit Fingern, Händen und Armen zu ergreifen, um ihn zu stoppen und zu halten, wie einen Ball fangen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<u>d455</u>	Sich auf andere Weise fortbewegen Sich auf andere Weise als gehend von einem Ort zu einem anderen fortzubewegen, wie über einen Fels klettern oder eine Straße entlang rennen, springen, spurten, hüpfen, einen Purzelbaum schlagen oder um Hindernisse rennen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<u>d465</u>	Sich unter Verwendung von Geräten/Ausrüstung fortbewegen Seinen ganzen Körper unter Verwendung von speziellen Geräten, die zur Erleichterung der Mobilität entworfen sind, oder anderen Hilfsvorrichtungen der Fortbewegung auf beliebigen Oberflächen oder in beliebigen Umgebungen von einem Ort zu einem anderen fortzubewegen, wie mit Schlittschuhen, mit Skiern oder mit einer Ausrüstung zum Gerätetauchen, oder sich auf einer Straße mit einem Rollstuhl oder Gehwagen fortbewegen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<u>d470</u>	Transportmittel benutzen Transportmittel zu benutzen, um sich als Fahrgast fortzubewegen, wie als Mitfahrer mit einem Auto oder Autobus, einer Rikscha, einem Ruderboot, einem von einem Tier angetriebenen Fahrzeug, mit einem privaten oder öffentlichen Taxi, Autobus, Zug, Straßenbahn, U-Bahn, Schiff oder Flugzeug	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<u>d475</u>	Ein Fahrzeug fahren Ein Fahrzeug oder das Tier, das es zieht, zu kontrollieren und zu bewegen, unter eigener Leitung zu reisen oder über ein beliebiges Fahrzeug zu verfügen wie ein Auto, Fahrrad, Boot oder ein von einem Tier angetriebenes Fahrzeug	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
d5	SELBSTVERSORGUNG		

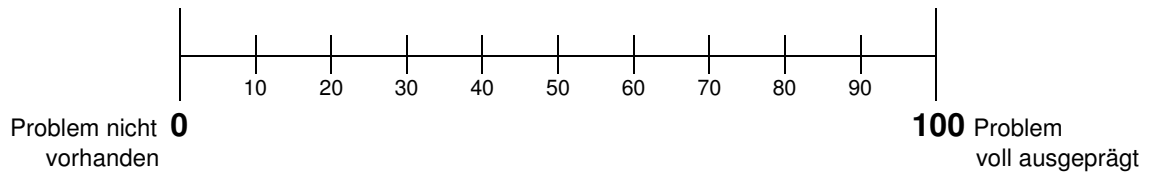
VAS zur Beurteilung des Ausmaßes der Beeinträchtigung der Aktivitäts- und Partizipationskategorien:			
d510	Sich waschen Den ganzen Körper oder Körperteile mit Wasser und geeigneten Reinigungs- und Abtrocknungsmaterialien oder -methoden zu waschen und abzutrocknen, wie baden, duschen, Hände, Füße, Gesicht und Haare waschen und mit einem Handtuch abtrocknen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/> 9 <input type="checkbox"/> C <input type="checkbox"/>
d520	Seine Körperteile pflegen Sich um seine Körperteile wie Haut, Gesicht, Zähne, Kopfhaut, Nägel und Genitalien über das Waschen und Abtrocknen hinaus zu kümmern	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/> 9 <input type="checkbox"/> C <input type="checkbox"/>
d530	Die Toilette benutzen Die Beseitigung menschlicher Ausscheidungen (Menstruationssekrete, Urin, Stuhl) zu planen und durchzuführen sowie sich anschließend zu reinigen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/> 9 <input type="checkbox"/> C <input type="checkbox"/>
d540	Sich kleiden Die koordinierten Handlungen und Aufgaben durchzuführen, welche das An- und Ausziehen von Kleidung und Schuhwerk in Abfolge und entsprechend den sozialen und klimatischen Bedingungen betreffen, wie Hemden, Röcke, Blusen, Hosen, Unterwäsche, Saris, Kimonos, Strumpfhosen, Hüte, Handschuhe, Mäntel, Schuhe, Stiefel, Sandalen oder Slipper anziehen, ordnen und ausziehen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/> 9 <input type="checkbox"/> C <input type="checkbox"/>
d550	Essen Die koordinierten Handlungen und Aufgaben durchzuführen, die das Essen servierter Speisen betreffen, sie zum Mund zu führen und auf kulturell akzeptierte Weise zu verzehren, Nahrungsmittel in Stücke zu schneiden oder zu brechen, Flaschen und Dosen zu öffnen, Essbesteck zu benutzen, Mahlzeiten einzunehmen, zu schlemmen oder zu speisen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/> 9 <input type="checkbox"/> C <input type="checkbox"/>
d560	Trinken Ein Gefäß mit einem Getränk in die Hand zu nehmen, es zum Mund zu führen und den Inhalt in kulturell akzeptierter Weise zu trinken, Flüssigkeiten zum Trinken zu mischen, zu rühren, zu gießen, Flaschen und Dosen zu öffnen, mit einem Strohhalm zu trinken oder fließendes Wasser wie z. B. vom Wasserhahn oder aus einer Quelle zu trinken; an der Brust zu trinken (Säugling)	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/> 9 <input type="checkbox"/> C <input type="checkbox"/>
d570	Auf seine Gesundheit achten Für physischen Komfort, Gesundheit sowie für physisches und mentales Wohlbefinden zu sorgen, wie eine ausgewogene Ernährung und ein angemessenes Niveau körperlicher Aktivität aufrecht erhalten, sich warm oder kühl halten, Gesundheitsschäden vermeiden, sicheren Sex praktizieren einschließlich Kondome benutzen, für Impfschutz und regelmäßige ärztliche Untersuchungen sorgen)	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/> 9 <input type="checkbox"/> C <input type="checkbox"/>
d6 HÄUSLICHES LEBEN			
d620	Waren und Dienstleistungen des täglichen Bedarfs beschaffe Alle Waren und Dienstleistungen des täglichen Bedarfs auszuwählen, zu beschaffen und zu transportieren, wie Lebensmittel, Getränke, Kleidung, Reinigungsmaterial, Brennstoff, Haushaltsartikel, Utensilien, Kochgeschirr, häusliche Hilfsmittel und Werkzeuge auswählen, beschaffen, transportieren und lagern; Versorgungs- und andere Dienstleistungen für den Haushalt beschaffen	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/> 9 <input type="checkbox"/> C <input type="checkbox"/>
d630	Mahlzeiten vorbereiten Einfache und komplexe Mahlzeiten für sich selbst und andere zu planen, zu organisieren, zu kochen und anzurichten, wie ein Menü zubereiten, genießbare Lebensmittel und Getränke auswählen, Zutaten für die Vorbereitung der Mahlzeit zusammenstellen, mit Wärme kochen sowie kalte Speisen und Getränke vorbereiten und die Speisen servieren	<input style="width: 40px; height: 20px;" type="text"/> VAS-Wert	8 <input type="checkbox"/> 9 <input type="checkbox"/> C <input type="checkbox"/>

VAS zur Beurteilung des Ausmaßes der Beeinträchtigung der Aktivitäts- und Partizipationskategorien:



d640	Hausarbeiten erledigen Einen Haushalt zu handhaben durch Reinigen des Hauses, Waschen von Kleidung, Benutzung von Haushaltsgeräten, Lagerung von Lebensmitteln, Entsorgung von Müll, wie fegen, moppfen; Tische, Wände und andere Oberflächen zu reinigen; Haushaltsmüll zu sammeln und zu entsorgen; Zimmer, Toiletten und Schubladen in Ordnung zu halten; schmutzige Kleidung zu sammeln, zu waschen, zu trocknen, zusammenzulegen und zu bügeln; Schuhwerk zu reinigen; Besen, Bürsten und Staubsauger, Waschmaschinen, Trockner und Bügeleisen zu benutzen	<input style="width: 50px; height: 20px;" type="text"/> VAS-Wert	8	9	C
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d650	Haushaltsgegenstände pflegen Haushalts- und andere persönliche Gegenstände, einschließlich Haus und dessen Inhalt, Kleidung, Fahrzeuge und Hilfsmittel instand halten und instand setzen sowie sich um Pflanzen und Tiere kümmern, wie Räume anstreichen und tapezieren, Einrichtungsgegenstände befestigen, Wasserleitungen instand setzen, die Funktionsfähigkeit von Fahrzeugen sicherstellen, Pflanzen gießen, Haus- und Nutztiere pflegen und füttern	<input style="width: 50px; height: 20px;" type="text"/> VAS-Wert	8	9	C
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d660	Anderen helfen Haushaltsmitgliedern und anderen beim Lernen, Kommunizieren, der Selbstversorgung, der (Fort-)Bewegung innerhalb und außerhalb des Hauses zu helfen; sich dem Wohlbefinden der Haushaltsmitglieder und anderer widmen	<input style="width: 50px; height: 20px;" type="text"/> VAS-Wert	8	9	C
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d7	INTERPERSONELLE INTERAKTIONEN UND BEZIEHUNGEN	<input style="width: 50px; height: 20px;" type="text"/> VAS-Wert	8	9	C
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d710	Elementare interpersonelle Aktivitäten				
d720	Komplexe interpersonelle Interaktionen				
d730	Mit Fremden umgehen				
d740	Formelle Beziehungen				
d750	Informelle soziale Beziehungen				
d760	Familienbeziehungen				
d770	Intime Beziehungen				
d8	BEDEUTENDE LEBENSBEREICHE				
d810-d839	Erziehung/Bildung	<input style="width: 50px; height: 20px;" type="text"/> VAS-Wert	8	9	C
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d810	Informelle Bildung/Ausbildung				
d815	Vorschulerziehung				
d820	Schulbildung				
d825	Theoretische Berufsausbildung				
d830	Höhere Bildung und Ausbildung				
d839	Bildung/Ausbildung, anders oder nicht näher bezeichnet				
d840-d859	Arbeit und Beschäftigung	<input style="width: 50px; height: 20px;" type="text"/> VAS-Wert	8	9	C
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

VAS zur Beurteilung des Ausmaßes der Beeinträchtigung der Aktivitäts- und Partizipationskategorien:



- d840 Vorbereitung auf Erwerbstätigkeit
- d845 Eine Arbeit erhalten, behalten und beenden
- d850 Bezahlte Tätigkeit
- d855 Unbezahlte Tätigkeit
- d859 Arbeit und Beschäftigung, anders oder nicht näher bezeichnet

d9 GEMEINSCHAFTS-, SOZIALES- UND STAATSBÜRGERLICHE LEBEN

d920 Erholung und Freizeit

Sich an allen Formen des Spiels, von Freizeit- oder Erholungsaktivitäten zu beteiligen, wie an Spiel und Sport in informeller oder organisierter Form, Programmen für die körperliche Fitness, Entspannung, Unterhaltung oder Zerstreuung; Kunstgalerien, Museen, Kino oder Theater besuchen, Handarbeiten machen und Hobbys frönen, zur Erbauung lesen, Musikinstrumente spielen; Sehenswürdigkeiten besichtigen, Tourismus- und Vergnügungsreisen machen

	8	9	C
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VAS-Wert			

Zusätzlich relevante* Bereiche der **AKTIVITÄTEN** und **PARTIZIPATION**, die in das Core Set der Hand aufgenommen werden müssten:

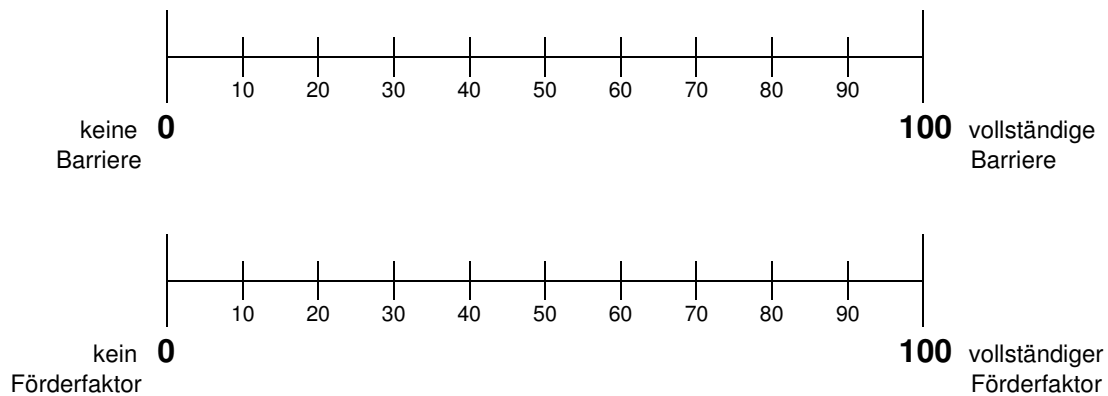
* Relevant im Sinne von notwendig, um die Funktionsfähigkeit und Behinderung umfassend zu beschreiben.

UMWELTFAKTOREN

Bitte bewerten Sie, in welchem Ausmaß die auf den folgenden Seiten aufgelisteten Umweltfaktoren eine Barriere und/oder einen Förderfaktor darstellen. Bitte berücksichtigen Sie dabei, dass die Umweltfaktoren aus der Sicht der/des Patientin/en kodiert werden sollten. Verwenden Sie zur Beurteilung den Leitfaden „Erfassung von Umweltfaktoren“.

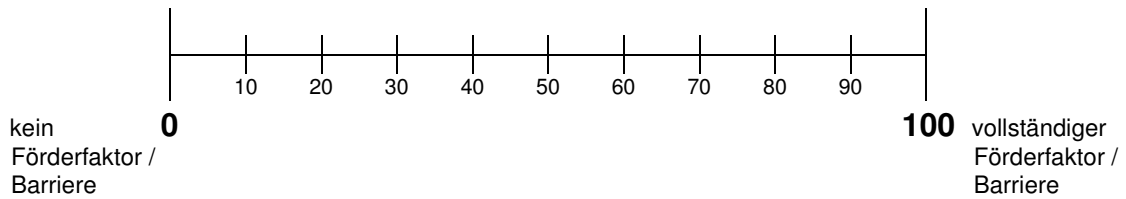
Umweltfaktoren bilden die materielle, soziale und einstellungsbezogene Umwelt, in der Menschen leben und ihr Dasein entfalten.

Anhand der beiden Visuellen Analogskalen (VAS) ist das Ausmaß des Umweltfaktors als Barriere und/oder als Förderfaktor zu bewerten.



- 0 – Umweltfaktor ist kein Förderfaktor (F) / keine Barriere (B)
- +/- 100 – Umweltfaktor ist vollständiger Förderfaktor (F) (+100) / vollständige Barriere (B) (-100)
- +/- 8 – Nicht spezifiziert
(ein Förderfaktor (+8) und/oder eine Barriere (-8) liegt vor, die Informationen sind aber unzureichend, um einen Schweregrad anzugeben)
- 9 – Nicht anwendbar
(die Angabe eines Kodes ist unangebracht)
- C – Komorbidität
(der Förderfaktor / die Barriere hängt ausschließlich mit einer Komorbidität zusammen und nicht mit der Verletzung / Erkrankung der Hand)
- K.I. – Keine Information
(es liegt keine Information vor, um diese Kategorie zu beurteilen)

VAS zur Beurteilung des Ausmaßes des Umweltfaktors als Barriere oder als Förderfaktor:



e1 PRODUKTE UND TECHNOLOGIEN					
e110	Produkte und Substanzen für den persönlichen Verbrauch Alle natürlichen oder vom Menschen hergestellten Produkte oder Substanzen, für den persönlichen Verbrauch gesammelt, verarbeitet oder hergestellt	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> k.l. <input type="checkbox"/>
e115	Produkte und Technologien zum persönlichen Gebrauch im täglichen Leben Von Menschen für ihre täglichen Aktivitäten benutzte Ausrüstungsgegenstände, Produkte und Technologien in oder nahe beim Körper getragen, einschließlich solcher, die angepasst oder speziell entworfen sind	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> k.l. <input type="checkbox"/>
e120	Produkte und Technologien zur persönlichen Mobilität drinnen und draußen und zum Transport Ausrüstungsgegenstände, Produkte und Technologien, die von Menschen für ihre Aktivitäten der Mobilität innerhalb und außerhalb von Gebäuden benutzt werden, einschließlich solcher, die angepasst oder speziell entworfen sind, und sich bei ihnen bzw. sich in ihrer Nähe befinden	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> k.l. <input type="checkbox"/>
e125	Produkte und Technologien zur Kommunikation Von Menschen für Ihre Aktivitäten des Sendens und Empfangens von Informationen benutzte Ausrüstungsgegenstände, Produkte und Technologien, die sich im oder am Körper des Benutzers oder in seiner Nähe befinden, einschließlich solcher, die angepasst oder speziell entworfen sind	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> k.l. <input type="checkbox"/>
e130	Produkte und Technologien für Bildung/Ausbildung Von Menschen für den Erwerb von Wissen, Fachwissen oder Fertigkeiten benutzte Ausrüstungsgegenstände, Produkte, Verfahren, Methoden und Technologien, einschließlich solcher, die angepasst oder speziell entworfen sind	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> k.l. <input type="checkbox"/>
e135	Produkte und Technologien für die Erwerbstätigkeit Zur Ermöglichung der Arbeitsaktivitäten im Rahmen der Erwerbstätigkeit benutzte Ausrüstungsgegenstände, Produkte und Technologien	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> k.l. <input type="checkbox"/>
e140	Produkte und Technologien für Kultur, Freizeit und Sport Für die Durchführung und Verbesserung der Kultur-, Freizeit- und Sportaktivitäten benutzte Ausrüstungsgegenstände, Produkte und Technologien, einschließlich solcher, die angepasst oder speziell entworfen sind	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> k.l. <input type="checkbox"/>
e150	Entwurf, Konstruktion sowie Bauprodukte und Technologien von öffentlichen Gebäuden Produkte und Technologien, für den öffentlichen Zugang geplant und konstruiert, welche die bebaute Umgebung (Innen- und Außenbereiche) eines Individuums bilden, einschließlich solcher, die angepasst oder speziell entworfen sind	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> k.l. <input type="checkbox"/>
e155	Entwurf, Konstruktion sowie Bauprodukte und Technologien von privaten Gebäuden Produkte und Technologien, für die private Nutzung geplant und konstruiert, welche die bebaute Umgebung (Innen- und Außenbereiche) eines Individuums bilden, einschließlich solcher, die angepasst oder speziell entworfen sind	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> k.l. <input type="checkbox"/>

VAS zur Beurteilung des Ausmaßes des Umweltfaktors als Barriere oder als Förderfaktor:					
e165	Vermögenswerte Produkte oder Gegenstände des wirtschaftlichen Handelns wie Geld, Waren, Immobilien und andere Wertsachen, die einem Individuum gehören oder zu deren Verwendung es berechtigt ist	-	+	-8	+8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		VAS-(B)	VAS-(F)	<input type="checkbox"/>	k.l. <input type="checkbox"/>
e2 NATÜRLICHE UND VOM MENSCHEN VERÄNDERTE UMWELT					
e225	Klima Meteorologische Merkmale und Ereignisse wie das Wetter	-	+	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
		VAS-(B)	VAS-(F)	<input type="checkbox"/>	k.l. <input type="checkbox"/>
e3 UNTERSTÜTZUNG UND BEZIEHUNGEN					
e310	Engster Familienkreis Personen, die infolge Geburt oder Heirat verwandt sind oder andere Beziehungen, die von der Kultur als 'engster Familienkreis' anerkannt sind, wie Ehepartner, Lebensgefährten, Eltern, Geschwister, Kinder, Pflegeeltern, Adoptiveltern und Großeltern	-	+	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
		VAS-(B)	VAS-(F)	<input type="checkbox"/>	k.l. <input type="checkbox"/>
e320	Freunde Personen, die sich nahe stehen und deren kontinuierliche Bekanntschaft durch Vertrauen und gegenseitige Unterstützung gekennzeichnet ist	-	+	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
		VAS-(B)	VAS-(F)	<input type="checkbox"/>	k.l. <input type="checkbox"/>
e325	Bekannte, Seinesgleichen (Peers), Kollegen, Nachbarn und andere Gemeindemitglieder Personen, die sich als Bekannte, Seinesgleichen, Kollegen, Nachbarn und als Gemeindemitglieder kennen, etwa von der Arbeit, Schule oder Freizeit, über Kommunikationssysteme wie Telefon, Fernschreiber, Internet, E-Mail oder über andere Möglichkeiten, und die demographische Eigenschaften wie Alter, Geschlecht, religiöses Bekenntnis, ethnische Zugehörigkeit oder gemeinsame Interesse teilen	-	+	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
		VAS-(B)	VAS-(F)	<input type="checkbox"/>	k.l. <input type="checkbox"/>
e330	Autoritätspersonen Personen mit Entscheidungsverantwortung für andere, die infolge Ihrer sozialen, ökonomischen, kulturellen oder religiösen Rollen in der Gesellschaft sozial definierten Einfluss oder Befugnisse haben, wie Lehrer, Arbeitgeber, Supervisoren, religiöse Führer, Vertreter im Amt, Vormund, Treuhänder	-	+	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
		VAS-(B)	VAS-(F)	<input type="checkbox"/>	k.l. <input type="checkbox"/>
e335	Untergebene Personen, deren tägliches Leben bei der Arbeit, in der Schule oder in anderen Bereichen durch Autoritätspersonen beeinflusst wird, wie Schüler, Studenten, Arbeiter und Mitglieder religiöser Gruppen	-	+	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
		VAS-(B)	VAS-(F)	<input type="checkbox"/>	k.l. <input type="checkbox"/>
e340	Persönliche Hilfs- und Pflegepersonen Personen, die Dienstleistungen erbringen, welche erforderlich sind, um Personen bei ihren täglichen Aktivitäten, bei der Erhaltung und Durchführung der Arbeit am Arbeitsplatz, im Bildungs-/Ausbildungsbereich oder in anderen Lebenssituationen zu unterstützen, wobei dieser Dienst entweder durch öffentliche oder private Träger erfolgt oder auf ehrenamtlicher Basis, wie Anbieter von Hilfen bei Hausarbeit und Haushaltsführung, personelle Assistenz, Assistenz beim Transport und anderen Unterstützungserfordernissen durch bezahlte Hilfen, Kindermädchen und andere, die vornehmlich Betreuungs- oder Pflegeleistungen erbringen	-	+	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
		VAS-(B)	VAS-(F)	<input type="checkbox"/>	k.l. <input type="checkbox"/>

VAS zur Beurteilung des Ausmaßes des Umweltfaktors als Barriere oder als Förderfaktor:				
e345	Fremde Personen, die sich weder kennen noch verwandt sind oder die bisher weder eine Beziehung eingegangen sind noch Kontakt zueinander haben, einschließlich Personen, die einer bestimmten Person zwar unbekannt sind, die jedoch eine Lebenssituation mit ihr teilen, wie Vertretungslehrer, Mitarbeiter oder Pflegekräfte	- VAS-(B)	+ VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e355	Fachleute der Gesundheitsberufe Alle Dienstleistungserbringer, die im Gesundheitssystem arbeiten, wie Ärzte, Schwestern, Physiotherapeuten, Ergotherapeuten, Sprachtherapeuten, Audiologen, Hersteller von Orthesen und Prothesen, medizinische Sozialarbeiter	- VAS-(B)	+ VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e360	Andere Fachleute Alle Fachleute, die außerhalb des Gesundheitssystems arbeiten, einschließlich Sozialarbeiter, Rechtsanwälte, Lehrer, Architekten und Konstrukteure	- VAS-(B)	+ VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e4 EINSTELLUNGEN				
e410	Individuelle Einstellungen der Mitglieder des engsten Familienkreises Allgemeine oder spezifische Meinungen und Überzeugungen der Mitglieder des engsten Familienkreises, die eine bestimmte Person oder andere Dinge (z.B. soziale, politische und ökonomische Themen) betreffen, und die individuelles Verhalten und Handlungen beeinflussen	- VAS-(B)	+ VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e420	Individuelle Einstellungen von Freunden Allgemeine oder spezifische Meinungen und Überzeugungen von Freunden, die eine bestimmte Person oder andere Dinge (z.B. soziale, politische und ökonomische Themen) betreffen, und die individuelles Verhalten und Handlungen beeinflussen	- VAS-(B)	+ VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e425	Individuelle Einstellungen von Bekannten, Seinesgleichen (Peers), Kollegen, Nachbarn und anderen Gemeindemitgliedern Allgemeine oder spezifische Meinungen und Überzeugungen von Bekannten, Seinesgleichen (Peers), Kollegen, Nachbarn und anderen Gemeindemitgliedern, die eine bestimmte Person oder andere Dinge (z.B. soziale, politische und ökonomische Themen) betreffen, und die individuelles Verhalten und Handlungen beeinflussen	- VAS-(B)	+ VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e430	Individuelle Einstellungen von Autoritätspersonen Allgemeine oder spezifische Meinungen und Überzeugungen von Autoritätspersonen, die eine bestimmte Person oder andere Dinge (z.B. soziale, politische und ökonomische Themen) betreffen, und die individuelles Verhalten und Handlungen beeinflussen	- VAS-(B)	+ VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e440	Individuelle Einstellungen von persönlichen Hilfs- und Pflegepersonen Allgemeine oder spezifische Meinungen und Überzeugungen von persönlichen Hilfs- und Pflegepersonen, die eine bestimmte Person oder andere Dinge (z.B. soziale, politische und ökonomische Themen) betreffen, und die individuelles Verhalten und Handlungen beeinflussen	- VAS-(B)	+ VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e445	Individuelle Einstellungen von Fremden Allgemeine oder spezifische Meinungen und Überzeugungen von Fremden, die eine bestimmte Person oder andere Dinge (z.B. soziale, politische und ökonomische Themen) betreffen, und die individuelles Verhalten und Handlungen beeinflussen	- VAS-(B)	+ VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.

VAS zur Beurteilung des Ausmaßes des Umweltfaktors als Barriere oder als Förderfaktor:

e450	Individuelle Einstellungen von Fachleuten der Gesundheitsberufe Allgemeine oder spezifische Meinungen und Überzeugungen von Fachleuten der Gesundheitsberufe, die eine bestimmte Person oder andere Dinge (z.B. soziale, politische und ökonomische Themen) betreffen, und die individuelles Verhalten und Handlungen beeinflussen	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8	+8	9	C	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	k.l.			
e455	Individuelle Einstellungen von anderen Fachleuten Allgemeine oder spezifische Meinungen und Überzeugungen von anderen Fachleuten, die eine bestimmte Person oder andere Dinge (z.B. soziale, politische und ökonomische Themen) betreffen, und die individuelles Verhalten und Handlungen beeinflussen	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8	+8	9	C	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	k.l.			
e460	Gesellschaftliche Einstellungen Allgemeine oder spezifische Meinungen und Überzeugungen, die im allgemeinen von Mitgliedern einer Kultur, Gesellschaft oder subkulturellen oder anderen gesellschaftlichen Gruppen zu anderen Menschen oder zu sozialen, politischen und ökonomischen Themen vertreten werden, und die Verhaltensweisen oder Handlungen einer Einzelperson oder Personengruppe beeinflussen	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8	+8	9	C	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	k.l.			
e465	Gesellschaftliche Normen, Konventionen und Weltanschauungen Sitten, Praktiken/Bräuche, Regeln sowie abstrakte Wertsysteme und normative Überzeugungen (z. B. Ideologien, normative Weltanschauungen und moralphilosophische Ansichten), welche innerhalb gesellschaftlicher Kontexte entstehen, und die gesellschaftliche und individuelle Gewohnheiten und Verhaltensweisen beeinflussen oder schaffen, wie gesellschaftliche Normen der Moral, der religiösen Verhaltensweisen oder Etikette; religiöse Lehren und daraus abgeleitete Normen und Konventionen; Normen, die Rituale oder das Zusammensein sozialer Gruppen bestimmen	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8	+8	9	C	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	k.l.			
e5	DIENSTE, SYSTEME UND HANDLUNGSGRUNDSÄTZE							
e525	Dienste, Systeme und Handlungsgrundsätze des Wohnungswesens Dienste, Systeme und Handlungsgrundsätze für Bereitstellung von Unterkünften, Wohnungen oder möblierten Zimmer für Menschen	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8	+8	9	C	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	k.l.			
e530	Dienste, Systeme und Handlungsgrundsätze des Versorgungswesens Dienste, öffentliche Einrichtungen und rechtliche Vorschriften für öffentlich bereit gestellte Versorgungsleistungen wie Wasser, Brennstoff, Elektrizität, Entsorgung, öffentlicher Transport und andere notwendige Dienste	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8	+8	9	C	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	k.l.			
e535	Dienste, Systeme und Handlungsgrundsätze des Kommunikationswesens Dienste, öffentliche Einrichtungen und rechtliche Vorschriften für Übermittlung und Austausch von Informationen	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8	+8	9	C	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	k.l.			
e540	Dienste, Systeme und Handlungsgrundsätze des Transportwesens Dienste, Systeme und Handlungsgrundsätze für die Beförderung von Menschen und Gütern von einem Ort zu einem anderen	<input type="checkbox"/> - VAS-(B)	<input type="checkbox"/> + VAS-(F)	-8	+8	9	C	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	k.l.			

VAS zur Beurteilung des Ausmaßes des Umweltfaktors als Barriere oder als Förderfaktor:				
e550	Dienste, Systeme und Handlungsgrundsätze der Rechtspflege Dienste, öffentliche Einrichtungen und Handlungsgrundsätze, welche die Gesetzgebung und andere Rechtsprechung eines Landes betreffen	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="-"/> VAS-(B)	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="+"/> VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e555	Dienste, Systeme und Handlungsgrundsätze von Vereinigungen und Organisationen Dienste und Programme von Personen, die sich zwecks Verfolgung allgemeiner, nicht-kommerzieller Interessen mit anderen Personen mit gleichen Interessen zusammengeschlossen haben, wobei die Erbringung solcher Dienste an eine Mitgliedschaft gebunden sein kann	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="-"/> VAS-(B)	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="+"/> VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e570	Dienste, Systeme und Handlungsgrundsätze der sozialen Sicherheit Dienste, Systeme und Handlungsgrundsätze für die finanzielle Unterstützung von Menschen, welche aufgrund von Alter, Armut, Arbeitslosigkeit, Gesundheitsproblemen oder Behinderung staatliche Unterstützung benötigen, die entweder durch Steueraufkommen oder Beitragssysteme finanziert wird	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="-"/> VAS-(B)	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="+"/> VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e575	Dienste, Systeme und Handlungsgrundsätze der allgemeinen sozialen Unterstützung Dienste, Systeme und Handlungsgrundsätze für diejenigen, die Hilfe in Bereichen wie Einkaufen, Hausarbeit, Beförderung, Selbstversorgung und anderen benötigen, um eine vollständigere Partizipation [Teilhabe] am Leben in der Gesellschaft zu erlangen	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="-"/> VAS-(B)	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="+"/> VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e580	Dienste, Systeme und Handlungsgrundsätze des Gesundheitswesens Dienste, Systeme und Handlungsgrundsätze zur Vorbeugung und Behandlung von Gesundheitsproblemen, zur medizinischen Rehabilitation und zur Förderung einer gesunden Lebensführung	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="-"/> VAS-(B)	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="+"/> VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e585	Dienste, Systeme und Handlungsgrundsätze des Bildungs- und Ausbildungswesens Dienste, Systeme und Handlungsgrundsätze für die Aneignung, Erhaltung und Vergrößerung von Wissen, Fachkenntnissen und beruflichen oder künstlerischen Fertigkeiten. Siehe International Standard Classification of Education der UNESCO (ISCED-1997)	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="-"/> VAS-(B)	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="+"/> VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.
e590	Dienste, Systeme und Handlungsgrundsätze des Arbeits- und Beschäftigungswesens Dienste, Systeme und Handlungsgrundsätze zur Vermittlung passender Arbeit für Personen, die arbeitslos sind oder den Arbeitsplatz wechseln wollen, oder zur Unterstützung von Arbeitnehmern, die einen Aufstieg beabsichtigen	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="-"/> VAS-(B)	<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="+"/> VAS-(F)	-8 +8 9 C <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> k.l.

Zusätzliche relevante* **UMWELTFAKTOREN**, die in das Core Set der Hand aufgenommen werden müssten:

* Relevant im Sinne von notwendig, um die Funktionsfähigkeit und Behinderung umfassend zu beschreiben.

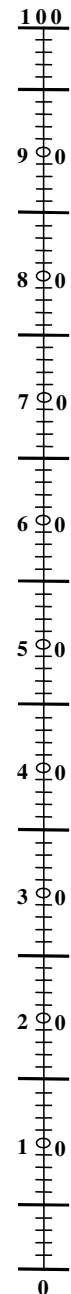
Allgemeiner Gesundheitszustand

Wie würden Sie den Gesundheitszustand der/des Patientin/en im Allgemeinen beschreiben?

Bitte kennzeichnen Sie auf dieser Skala, wie gut oder schlecht Ihrer Ansicht nach der Gesundheitszustand Ihres Patienten heute ist.

Der best denkbare Gesundheitszustand ist mit einer "100" gekennzeichnet, der schlechteste mit "0".

Best
denkbarer
Gesundheitszustand



Schlechtest
denkbarer
Gesundheitszustand

12 Publikationen

Veröffentlichte Publikationen

Kus S, vd Ven-Stevens L, Coenen M, Berno S, Kollerits B, Cieza A. (2011) What is our knowledge of functioning and disability in hand conditions based on? *Archives of Physical Medicine and Rehabilitation*, Aug 2011; 92(8):1326-1332.

Rudolf KD, Kus S, Chung KC, Johnston M, LeBlanc M, Cieza A. (2011) Development of the International Classification of Functioning, Disability and Health Core Sets for Hand Conditions – Results of the World Health Organization International Consensus Process. *Disability & Rehabilitation*, accepted August 8th 2011

Kus S, Dereskewitz C, Wickert M, Schwab M, Eisenschenk A, Steen M, Rudolf KD. (2011) Validation of the Comprehensive International Classification of Functioning, Disability and Health (ICF) Core Set for Hand Conditions. *Hand Therapy*, 2011; 16: 58–66.

Kus S, Müller M, Strobl R, Grill. (2011) Patient goals in post-acute geriatric rehabilitation – goal attainment is an indicator for improved functioning. *Rehabilitation Medicine*, Jan 2011; 43(2):156-161.

Rudolf KD, Kus S, Coenen M, Dereskewitz C, vd Ven-Stevens L, Cieza A. (2010) Report on the International ICF Consensus Conference on the ICF Core Sets for Hand Conditions. *Hand Therapy*, 2010; 15: 73-76.

Kus S, Coenen M, Cieza A. (2010) Die Entwicklung der ICF Core Sets der Hand – Überblick über die Vorbereitungsphase und die internationale ICF Konsensuskonferenz. *Zeitschrift für Handtherapie*, 1/2010;17-21.

Akzeptierte Publikationen

Kus S, Oberhauser C, Cieza A. Validation of the Brief International Classification of Functioning, Disability and Health (ICF) Core Set for Hand Conditions. *Journal of Hand Therapy*, accepted February 28th 2012.

Publikationen in Vorbereitung

Kus S, Coenen M, Rudolf KD, Müller G, Berno S, Dereskewitz C, MacDermid J. Do hand-specific patient-reported outcome measures capture functioning aspects and environmental factors important to individuals with injuries or disorders of the hand?

Rudolf KD, Kus S, Dereskewitz C, Schwab M, Werdin F, Wickert M, Steen M. Identification of the most common problems in functioning of individuals with hand conditions using the International Classification of Functioning Disability and Health (ICF).

Danksagung

Herzlich bedanken möchte ich mich

bei Herrn Prof. Dr. Gerold Stucki für die Überlassung des Themas dieser Doktorarbeit und insbesondere bei Frau PD Dr. Alarcos Cieza für die hervorragende Betreuung und Unterstützung bei der Anfertigung dieser Arbeit,

bei Frau Dr. Michaela Coenen, für ihr großes Engagement und ihre Hilfe bei der Korrektur der Doktorarbeit,

bei Frau Dipl. Stat. Cornelia Oberhauser für die von ihr entgegengebrachte Hilfsbereitschaft und Geduld bei der Beantwortung sämtlicher statistischer Fragen,

bei Barbara Kollerits, Stephanie Berno, Andreas Leib und Beatrix Algurén für ihre Mitarbeit beim Extrahieren und Linking der Studieninhalte sowie beim gesamten Team des Instituts für Gesundheits- und Rehabilitationswissenschaften der Ludwig-Maximilians-Universität München für die kollegiale Arbeitsatmosphäre.

Außerdem gebührt mein Dank allen teilnehmenden Patienten der Studie II sowie den interviewenden Gesundheitsfachpersonen der Abteilung für Handchirurgie, Plastische und Mikrochirurgie des Berufsgenossenschaftlichen Unfallkrankenhauses Hamburg, der Abteilung für Hand-, Replantations- und Mikrochirurgie des Unfallkrankenhauses Berlin und der Klinik für Plastische- und Handchirurgie der BG-Kliniken Bergmannstrost Halle, ohne deren engagierte und interessierte Mitarbeit die Daten nicht hätten erhoben werden können.

Mein besonderer Dank gilt meinem Partner, unseren Kindern und meinen Eltern für ihre Liebe und Unterstützung, ohne die die Entstehung dieser Arbeit nicht möglich gewesen wäre.