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Video Education and Mechanical Traction

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VIDEO EDUCATION AND MECHANICAL TRACTION

by

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An Independent Study

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1997

This Independent Study, submitted by Tiffany A. Orth in partial fulfillment of the requirements for the Degree of Master of Physical Therapy from the University of North Dakota, has been read by the Faculty Preceptor, Advisor, and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

Renee Mabey
(Faculty Preceptor)

(Graduate School Advisor)

(Chairperson, Physical Therapy)

PERMISSION

Title Video Education and Mechanical Traction

Department Physical Therapy

Degree Master of Physical Therapy

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Signature Tiffany A. Ott

Date 12/13/96

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ACKNOWLEDGEMENTS

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With all my heart I would like to thank my parents who have always supported me in all my endeavors, and cheered me onward when I was disheartened. They taught me to toil awhile, endure awhile, believe always, and never turn back. Another group of people that have had an impact on myself and all of the students are the faculty and staff. They have given us, over the past three years, all the knowledge that they have accumulated throughout their careers. Invaluable skills, wealth of knowledge, and unforgettable memories will linger on in all of us. As our time at school draws to a close, we will only begin to realize that instruction may end in the schoolroom, but education ends only in life.

ABSTRACT

I began this endeavor with several goals to accomplish. The main goal is to provide an educational video that may be used as a supplementary tool to PT 319: Techniques II. Theory and Technique of Thermo-Photo-Hydrotherapy. This video will demonstrate mechanical lumbar traction in the supine and prone positions as well as cervical traction in the seated and supine positions. The use of video in education enhances the transfer of information from instructor to student by providing consistent information, repetition, easy use, and realism.[1-3] Included with the video is a study guide that contains detailed listings of traction information that is not covered in the video demonstration. This video and study guide will be available to students within the physical therapy curriculum to enhance professional development.

CHAPTER I

INTRODUCTION

Imagine a narrow rectangular lecture room where the lecturer may be up to 40 feet from the farthest student. The class is PT 319: Techniques II. Theory and Techniques. Thermo-Photo-Hydrotherapy, and the lecture is on mechanical traction. Following an overhead transparency discussion of the efficacy, indications, and contraindications of traction, the instructor begins a verbal explanation of how to set-up and use mechanical traction. The students then move to the laboratory for a traction demonstration. While looking around the lab, many students are cramming to find a clear view of the demonstration. Following the class session, the instructor is approached by several individuals asking for clarification of lecture notes, and re-explanation of positioning for mechanical traction. It becomes obvious to the instructor that there has been a breakdown of transfer of information to the students.

This scene may be familiar to some instructors and students. It is at this point that an assessment of instructional tools may take place to discover which tools are helping, and what tools may be added. In the above situation, an educational video would have provided another medium in which to enhance the transfer of information from the instructor to the students. The use of a video would provide consistent information, repetition, easy use, and realism.[1-3]

The purpose of this project is to provide PT 319 students with a study guide, and a instructional video demonstrating mechanical lumbar and cervical traction. The results of this will enhance the transfer of information from instructor to the student who will then incorporate these ideas into his or her current knowledge base, and use the information provided for clinical practice.

CHAPTER II

USE OF VIDEO IN EDUCATION

"The goal of teaching in any educational setting is to transfer information from one individual to another with the hope that it will be incorporated and put to use by the person to whom the information is being presented."[4(p38)] This transfer of information occurs through mediums, of which video tapes are one. This chapter will examine the strengths and limitations of video in education, and it will discuss integrating video tapes into instruction.

Strengths

When an instructor describes occurrences or concepts to a student, confusion may arise in the transfer of information because the student visualizes the concept differently than the instructor. Using videos provides consistent information, and a common learning experience for its viewers.[1-3]

By using video tapes, the responsibility of learning is placed in the viewers hands. The viewers may watch the video when it is convenient for them[1] as well as set their own pace by rewinding and pausing when necessary.[2]

Video more closely approximates the real world than any other learning resources such as books, journals, or slides.[1] It uses motion and graphics to convey concepts that are often difficult to understand. The creativity of a video production may

also stimulate interest or curiosity of the topic presented.[3] In addition the visual depiction may make learning more memorable by incorporating previous knowledge. Then as earlier stated, the goal of teaching has been accomplished when information is transferred to another person who incorporates and uses the information.

The use of video in education enhances the transfer of information from the instructor to student by providing consistent information, repetition, easy use, and realism. Despite the usefulness of video in education, there are limitations of its use.

Limitations

There are inherent limitations of this teaching medium. Initially there is a cost.[1,3] This may be in the form of equipment to produce a video, or equipment to watch a video. Purchasing of professional video tapes may not be as expensive as producing one, but it also costs money.

Because of the nature of video tapes, there is no face-to-face contact between the presenter and the viewing audience.[1] Unless the video is thorough, questions by the viewer may be left unanswered. The questions may not allow full transfer of information which, as stated earlier, is a goal of teaching. Speculation by the viewer may then become a misinterpretation of the information presented in the video tape.

In an article based on a literature review of the efficacy of video in patient education, the author concluded that "video seemed just as good as, and often better than, other educational methods in increasing short-term knowledge."[2(p123)] The article also addressed long-term knowledge retention. Throughout 12 years of literature, 1975-1986, the authors reported only finding two articles on long-term retention. From this the

author suggested that video education is no better, and no worse than other methods for long-term knowledge retention.

Despite the inherent limitations of video, it can be integrated into instruction to help safeguard the transfer of information in the teaching process. The limitations of using video in education can be overcome when combining video tapes in lectures and discussion sections.

Integrating Video Tapes Into Instruction

"With all its capabilities, video tapes can be a powerful aid to instruction."[1(p121)] Video programs augment but do not replace instructors. "It (video) must be integrated with the instruction that has come before as well as after, whether a lecture, reading, self-instructional program or dialogue between students and instructors."[1(p121)]

The instructor has an important role in video education. Not only must the instructor integrate the video into instruction, but he or she must also discriminate between videos, in order to find a video that adequately covers the information that is to be emphasized. Prior to showing an educational video, it is also important that an instructor assess the knowledge of the viewer.[1] This will allow the instructor to alert the viewer to review skills already learned and enhance an easier transfer of new information.

It is also imperative that the instructor introduces the video tape in order to capture the viewers attention and arouse interest in the topic.[1] This allows the viewers to better receive the message within the video. Also, by introducing the video, the objectives and expectations may be communicated for performance after viewing.

After viewing the video, an instructor must assess the acquisition of the desired skills.[1] Since the video tape cannot predict the areas where students may have problems, it is necessary that an instructor be available to direct students to another video or to more information. Finally, the instructor must also evaluate the level at which the viewer can perform the desired skill.

As discussed earlier, the goal of teaching is to transfer information in a way that can be integrated and used by the learner. The video medium by nature has its limitation of increased cost, lack of face-to-face contact, and no proven long-term retention of knowledge. However, when video is integrated into instruction, it can enhance the transfer of information by providing consistent information, repetition, easy use, and realism.[1-3] This integration of video into instruction is the focus of this project. The following chapter provides information obtained from a short literature review of the efficacy of traction.

CHAPTER III

TRACTION LITERATURE REVIEW

Traction has been used as a medical procedure for centuries to heal several ailments. Until 1900, traction was used mainly to treat fractures, dislocations, and spinal deformities. As medicine grew so did the use of traction; early in the 20th century traction was used to facilitate casting and stretching of the soft tissue around the spine of scoliosis patients. It wasn't until the 1950s that Cyriax popularized lumbar traction for treatment of disc protrusions. The modern definition of traction "is the application of a force or a system of forces to the spine in a way that separates or attempts to separate the vertebrae and elongate the surrounding soft tissue." [5(p36)]

This chapter will look at a claim to disprove traction followed by a research review that uses imaging devices to show the mechanical effects of traction. It will then discuss the need for total management of disorders rather than using traction alone. Finally, this chapter will show the need for more consistent, well-structured, and reproducible research of mechanical traction.

A Claim to Disprove Traction

There has been research on mechanical traction for five decades with evidence proving and disproving certain aspects of traction. Although there are articles that claim

to disprove traction, with a discerning eye, many of these articles have been found to contain major flaws in their research design.

Weber[6] revealed no significant difference between patients' treatment with traction and a control group that received "sham" traction, therefore concluding that traction is ineffective. In this research, there were 86 patients with radiating pains and neurological signs at the L5-S1 level, and X-rays confirming the clinical findings. During the study, 14 patients dropped out because of the following: aggravation of symptoms, self-removal from the study, error of group categorizing due to researcher misunderstanding, and cancer. A closer look at the research showed Weber used tractional forces equal to 1/3 the patient's body weight in the treatment group, a force that doesn't overcome the frictional forces and inertia. This tractional force of 1/3 the patient's body weight is not a therapeutic dose, therefore no differences between the two groups would be expected. An article such as this has been used to cite proof that all forms of traction are ineffective.

Mechanical Effects Shown by Imaging Devices

Studies have used imagining devices to show changes produced by traction. In a study by Mathews[7], following an epidural injection of contrast medium, lateral radiographs were taken, before, during, and after traction in 11 patients with sciatica and a limited straight leg raise. The findings revealed reduction of disc prolapse, vertebral separation, and a flow of contrast materials into the disc spaces.

A study by Onel et al[8] used computed tomography to study the effects of static horizontal traction on disc herniations in 30 patients. Forty-five kilograms (99lb)

produced retraction of herniated nuclear material in 11 (78.5%) median herniations, 6 (66.6%) posterolateral herniations, and 4 (57.1%) lateral herniations. Twenty-eight of the 30 patients showed clinical improvements after one month of treatment that included traction. Widening of disc spaces, separation of apophyseal joint facets, increase in neural foramina, and thinning of the ligamentum flavum are mechanical effects that were noted as well. According to the authors, the retraction of the herniated nuclear material during traction is due to a suction effect of negative intradiscal pressures, and a stretching of the posterior longitudinal ligament that creates a pushing effect on the herniation.

Total Management

Despite the evidence to support mechanical effects, the clinical effectiveness still remains controversial. If patients are not carefully treated with a total management regimen, traction alone is likely to be unsuccessful because any anatomical correction that traction produces is unstable.[9] For example in a patient with a herniated disc, until the tear in the annulus fibrosis scars the nucleus pulposus may protrude again.

In a study by Lidstrom and Zachrisson,[10] 62 patients were randomly assigned to three groups. Subject entrance criteria was low back pain and sciatic pain of more than one month duration. The conventional treatment group received heat, massage, mobilization, and isotonic strengthening exercises for the spinal musculature. The alternative treatment group received pelvic traction with isometric abdominal and hip extensor exercises. The third group was a control group that received hot packs and rest. Traction was administered to the alternative treatment group for 20 minutes intermittently with four seconds hold, and two seconds rest; the force was approximately 43-53% of

body weight. All subjects received a total of 10 treatment sessions over a period of one month. Three measures were used to assess outcomes: 1) An orthopedic surgeon used a clinical evaluation to categorize each patient's condition as noticeable improvement, status quo, or noticeable change for the worse; 2) Patients rated their own progress using the same three categories; and 3) Patient's use of analgesics before and after treatment was compared. Ratings made by the orthopedic surgeon and by the subjects showed significantly greater improvement and less need for analgesics for the alternative treatment group than for the conventional or control groups.

Standardizing Research

Differences in diagnosis, type of traction, treatment technique, and outcome measures make it difficult to compare studies and draw definitive conclusions about the clinical effectiveness of traction. Despite the valiant effort by researchers to examine traction, Heijden et al.[11] states that past research has not been effective in proving the efficacy of traction. Heijden et al published a study which assessed the efficacy of traction in patients with neck or back pain by conducting a systematic analysis of literature using only articles with randomized clinical trials comparing traction with other treatments. Research emphasized two parts: the first was a criteria list for methodological assessment with four main criteria - study population, interventions, measurement of effect, and data presentation; this scoring also includes the main conclusions of the authors. The second scoring includes a calculation of confidence intervals and power of the studies. The results showed only three studies scored more than 50 points with 100 points as maximum, and only 1 of these 3 met the authors' acceptable power (1-â>80%).

The authors concluded that most of the selected studies were of poor quality, and that to date no conclusions can be drawn whether any traction has an effect, or is better than any other modality. The article also concludes that most studies lack power due to small sample size, and traction has not been proven to be an ineffective therapy for neck and back pain. The authors conclude that further trials are needed with attention to "proper design and conduct, as well as to clear descriptions of crucial methodological features and results."[11(p93)]

Future research is needed to standardize testing procedures in order to conclusively state traction does produce the desired effects. The previously mentioned article by Heijden et al.[11] may be used as a beginning point to develop research that is consistent, well-structured, and reproducible. This type of research is needed also because of health care reform. As health care reforms demand proof that treatments are effective, it has become imperative that future research include solid experimental designs in order to more precisely define the role of mechanical traction in physical therapy.

CHAPTER IV

DEVELOPMENT OF VIDEO

In the classroom setting, vague illustrations, and classroom size can contribute to poor student learning. Video can be a valuable tool in health science education and training because it can contribute to a higher quality educational experience.[1] This project provides a video tape which demonstrates lumbar traction in the supine and prone positions, and cervical traction in the supine and seated positions and a study guide.

The idea for this project grew from the PT 319 instructor's concern for improving the teaching of mechanical traction to junior physical therapy students at the University of North Dakota. The use of video provides consistent information, repetition, easy use, and realism to students. The additional study guide covers detailed listings of traction information that is not covered in the video demonstration. This video and study guide will be available to students within the physical therapy curriculum to enhance professional development. The study guide is shown in Appendix A. This chapter will discuss the preparation to video taping, and the steps taken in the production of the video.

Prior to videotaping, research on how to produce a video was completed. By reading, ideas were formulated regarding what equipment was needed, setting the background, and script writing. After reading about video production, video tapes produced by other students and staff were studied for content, style, transitions, and ideas.

An outline was then formulated containing the steps of traction for each of the four positions including the lumbar spine in the supine and prone positions, and the cervical spine in the supine and seated positions.

The next step was to gather equipment and personnel for the video production. Most of the equipment was supplied by the University of North Dakota Physical Therapy Department with the exception of the blank video tapes. The equipment used is as follows: a traction table, three traction units, a video camera, and a computer. The personnel helping with the production were students who volunteered their time to help film or participate as examples in the video. An audio-visual release form was also completed which is listed in Appendix B.

Once all the equipment was gathered, test videos were done to assess the backdrop, room lighting, acoustics, and color contrasts. During these test videos, the positioning of the traction table and camera were established. Cue cards which were used during the filming process were also formulated at this time.

After the preparations were finished, the video was filmed. Once the video was filmed, it was viewed in its entirety, and notes were taken to aid in the editing process. The editing process consisted of cutting and rearranging clips into the final product, followed by voice-over throughout parts of the video; the editing process was aided by Take One Productions. The University of North Dakota Department of Physical Therapy provided funding for the editing process of the video.

CHAPTER V

CONCLUSION

The key to teaching and learning is to transfer information in a method that the receiver can comprehend by integrating that information into his or her knowledge base and then using it appropriately.[4] There are several teaching tools that may be used as mediums for learning. This project uses a video and a study guide to aid in teaching mechanical lumbar and cervical traction for PT 319: Techniques II. Theory and Techniques of Thermo-Photo-Hydrotherapy.

Despite a valiant effort, this project by nature has a few faults. The first of these faults is that the video and study guide are meant only to supplement PT 319 and were not made to be all encompassing. This video initially should be preceded by an instructor introducing the topic of mechanical traction. Subsequent viewings of the video and use of the study guide may not require an instructor's input unless questions arise.

A second fault of this project is the lack of experience using audiovisual equipment. Prior to beginning this project, I had very little knowledge about where to start with such a project. Despite the effort to read texts and articles on how to develop a video, the real lack of knowledge showed with preliminary takes of the video. Several preliminary shots were taken to assess lighting, background, acoustics, color contrasts,

and equipment placement. Using the equipment correctly and script writing also required several retapings to produce a quality video.

Despite these limitations, this project will be advantageous to those who use it. It will provide consistent information, and realism to those who view it. Since this video and study guide will be available to students within the physical therapy curriculum, it will be convenient and easy for students to use again at a later date to review the material presented. The repetition of using the video and study guide will also aid students in learning the material.

This project has also been very advantageous to me personally. It has deepened my understanding of researching a project from start to finish, as well as broadening a knowledge base of mechanical lumbar and cervical traction. It has brought about skills in video production that may be used in my professional career when developing patient education tools, and when educating co-workers in topics related to physical therapy.

It is the hopes of this author that this project will aid student learning of the skills required in performing mechanical lumbar and cervical traction. This project will provide consistent information, repetition, easy use, and realism about traction which will hopefully stimulate learning that will enhance the professional development of students.

APPENDIX A

STUDY GUIDE

Effects of Mechanical Traction[12-14]

- distraction or separation of vertebral bodies
- combination of distraction & gliding of facet joints
- suction to draw a disc protrusion toward the center of the joint (extended position)
- tensing of the ligamentous structures of the spinal segment
- tensing of the posterior longitudinal ligament to help reduce nuclear material (extended position)
- widening of intervertebral foramen (flexed position)
- straightening of spinal curves (flexed position)
- distraction of apophyseal joint (flexed position)
- stretching of the spinal musculature produces:
    - ♦ relaxation in paraspinal muscles (flexed position)
    - ♦ reduction of bulging herniated disc (extended position)
    - ♦ reduction of pressure on nerve roots in the area of intervertebral foramen (flexed position)
- reduction of pain occurs by:
    - ♦ improving circulation by:
        1. reducing stenosis from circulatory congestion

2. decreasing the concentration of noxious chemical irritants

- ♦ decrease pressure on impinged nerve root by increasing invertebral foramen release meniscoid from entrapment or extrapment by distracting facet surfaces
- ♦ increase mobility of tight tissue or restricted movement
- ♦ stimulation of mechanoreceptors will block transmission of nociceptive stimuli
- ♦ inhibition of reflex muscle guarding will decrease the discomfort from the contracting muscle

Indications[12-14]

- nerve root impingement
  - ♦ herniated disc
  - ♦ narrowing of the intervertebral foramen
  - ♦ osteophyte encroachment (temporary relief only)
  - ♦ ligament encroachment
  - ♦ spondylolisthesis
  - ♦ spondylosis
- subacute joint pain
- degenerative joint disease (DJD) - subacute stage to increase ROM
- discogenic pain
- compression fracture - chronic stage
- joint hypomobility

- paraspinal muscle spasm
- facet impingement
- meniscoid blocking

Absolute Contraindications[12-14]

- Patient with local & systemic diseases that affect joints, ligaments, bones, & muscles
    - tumors
    - infections
    - rheumatoid arthritis (RA)
    - osteoporosis
- acute sprains or strains
- acute inflammation
- hypermobile joint
    - down's syndrome
- pressure of thoracic & lumbar regions may be hazardous in:
    - pregnancy
    - hiatal hernias
    - cardiac disorders
    - pulmonary disorders
- cord pressure
    - hyperactive reflexes
    - positive Babinski sign

- cerebral vascular accident (CVA)
- transient ischemic attacks (TIA)

Relative Contraindications[12-14]

- temporomandibular joint (TMJ) dysfunction
- osteoporosis
- anxiety & claustrophobia
- older age
- lack of improvement after 5-8 treatments
- patients with vascular conditions

Safety Rules[15]

- tables & ropes in good repair
- traction unit is secure
- friction-free table locked initially
- traction machine calibrated to true weight
- maintain sanitary barriers, clean tables & harnesses after each patient
- don't leave patient unattended without a call button & control to stop traction
- know your equipment
- know yourself

Changes That Necessitate Stopping Traction[12]

- symptoms increase during traction
- nausea

- visual changes
- dizziness
- shortness of breath
- cold & clammy
- hot & sweaty
- neurological symptoms occur

Modality	Diagnosis	Patient Position, Area of Treatment, and Angle of Pull	Poundage	On:Off Ratio	Duration
Cervical Traction	Disc	Seated or Supine Neutral (normal lordosis; postural position)	Disc or any Below C2: 25-45# Non-disc at C0/C1 or C1/C2: 10-15# (NOTE: gravity may require adjusting the poundage!)	Static preferred Intermittent: 3:1 (60 sec:20sec)	Static: 8 minutes Intermittent: 10 minutes
Cervical Traction	Facet, Muscle, Intervertebral Foramen	Seated or Supine C0/C1 or C1/C2: Normal lordosis Below C2: (10°) 20° - 30° Flexion		Static Intermittent 1:1 or 2:1 based upon purpose	Static or Intermittent: 10-15 minutes
Lumbar Traction	Disc	Prone Neutral lumbar flex/ext (normal lordotic position) Adjust angle of pull &/ height of table to maximize desired lumbar position	25% of body weight (BW) at first treatment 50% BW for minimal therapeutic dose 75% BW safe maximal therapeutic dose 10-15% of treatment dosage during intermittent release cycle (Adjust poundage to account for friction or friction-free surface!)	Static preferred Intermittent: 3:1 (60 sec:20 sec)	Static: 8 minutes Intermittent: 10 minutes
Lumbar Traction	Facet, Muscle, Intervertebral Foramen	Supine, hook-lying Posterior pelvic tilt & lumbar flexion to localize area of Rx Adjust angle of pull &/ height of table to maximize desired lumbar position		Static Intermittent, 1:1 or 2:1 based upon purpose	Up to 30 minutes

APPENDIX B

DEPARTMENT OF PHYSICAL THERAPY

SCHOOL OF MEDICINE

UNIVERSITY OF NORTH DAKOTA

AUDIO-VISUAL STANDARD RELEASE FORM

I hereby give my permission to the University of North Dakota Department of Physical Therapy, its agents, successors, assigns, clients, and purchasers of its services and/or products, to use my photograph (whether still, motion, or television) and recordings of my voice for educational and public awareness purposes.

DATE: 13 Dec 91

SIGNED: [signature]

ADDRESS: 122 N Wells

CITY: Grand Forks

STATE: North Dakota

REFERENCES

1. Van Son LG. Video in Health. White Plains, NY: Knowledge Industry Publications Inc;1982:11;120-123.

2. Gagliano ME. A Literature Review on the Efficacy of Video In Patient Education. J of Med Ed. Oct. 1988:63;785-792.

3. Chatham MAH, Knapp BL. Patient Education Handbook. Bowie, Md: Robert J Brady Company;1982:107-143.

4. Falvo DR. Effective Patient Education - A Guide to Increased Compliance. 2nd ed. Gaithersburg, Md: An Aspen Publication;1994:38.

5. Saunders MD. Lumbar traction. J Orthop Sports Phys Ther. 1979;1(1):36.

6. Weber H. Traction therapy in sciatica due to disc prolapse. J Oslo City Hosp. 1972;23(10):167-176.

7. Mathews JA. Dynamic discography: a study of lumbar traction. Ann Phys Med 1968;9:275-279.

8. Onel D, Tuzlaci M, Sari H, Demir K. Computed tomographic investigation of the effects of traction on lumbar disc herniations. Spine. 1989;14:82-90.

9. Saunders HD, Saunders R. Evaluation, Treatment, and Prevention of Musculoskeletal Disorders. 3rd ed. Educational Opportunities: Bloomington, Minn;1993:275-302.

10. Lindstrom A, Zachrisson M. Physical therapy on low back pain and sciatica: an attempt at evaluation. Scand J Rehabil Med 1970;2:37-42.

11. Heijden G, Beurskens A, Koes BW, Bouter H. The efficacy of traction for back and neck pain: a systematic, blinded review of randomized clinical trial methods. Phys Ther. 1995;75(2):93-104.

12. Hecox B, Mehreteab TA, Weisburg J. Physical Agents A Comprehensive Text for Physical Therapists. Norwalk, Conn: Appelton & Lange;1994:397-417.

13. Kisner C, Colby LA. Therapeutic Exercise: Foundations and Techniques. 2nd ed. Philadelphia, Pa: F. A. Davis Company;1990:501-517.

14. Mathews JA. The effects of spinal traction. Physiotherapy. 1972;58:64-66.

15. Mabey RJ. PT 319: Techniques II. Theory and Techniques of Thermo-Photo-Hydrotherapy. Class notes 1995.

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    - infections
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    - down's syndrome
- pressure of thoracic & lumbar regions may be hazardous in:
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