

The prevalence of thumb problems in Australian physiotherapists is high: an observational study

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Question: What is the lifetime and current prevalence of thumb problems in Australian physiotherapists and what are the factors associated with thumb problems? **Design:** Survey of a random cross-section of physiotherapists. **Participants:** 1562 (approximately 10% of the total) registered Australian physiotherapists. **Outcome measures:** General questions covered demographic information, area of practice, hours worked per week, and years worked as a physiotherapist. Specific questions about thumb problems covered thumb affected, symptoms, onset of symptoms, treatment sought, relevance of work-related factors, and joint hypermobility. **Results:** 1102 (71%) questionnaires were returned and 961 (68%) completed. The lifetime prevalence of thumb problems was 65% and the current prevalence was 41%. Factors that were significantly associated with thumb problems included: working in orthopaedic outpatients (OR 3.2, 95% CI 1.8 to 5.8); using manual therapy (OR 2.3 to 3.4, 95% CI 1.7 to 5.1), trigger point therapy (OR 2.3, 95% CI 1.7 to 3.0) and massage (OR 2.1, 95% CI 1.6 to 2.8); having thumb joint hypermobility (OR 2.2 to 2.6, 95% CI 1.4 to 4.5); or an inability to stabilise the joints of the thumb whilst performing physiotherapy techniques (OR 4.2, 95% CI 2.9 to 5.9). Of those respondents who reported thumb problems, 19% had changed their area of practice and 4% had left the profession as a result of their thumb problems. **Conclusion:** The prevalence of thumb problems in Australian physiotherapists appears to be high and can be of sufficient severity to impact on careers. [McMahon M, Stiller K, Trott P (2006) The prevalence of thumb problems in Australian physiotherapists is high: an observational study. *Australian Journal of Physiotherapy* 52: 287–292]

Key words: Thumb, Pain, Physiotherapy, Musculoskeletal System, Occupational Health

Introduction

Thumb problems are a common occupational hazard for physiotherapists, with their prevalence second to back/neck pain (Glover 2002) and associated with work activities, particularly techniques that repeatedly compress the thumb joints (Armstrong et al 1993, Bork et al 1996, Cromie et al 2000, Gordon et al 1995, Kumar 2001, Snodgrass and Rivett 2002, Snodgrass et al 2003, Wajon and Ada 2003, West and Gardner 2001).

While the prevalence of thumb problems in some groups of Australian physiotherapists has been investigated (Caragianis 2002, Cromie et al 2000, Wajon and Ada 2003, West and Gardner 2001), to date there has not been a truly national survey. Additionally, there is only limited research regarding the risk factors for thumb problems in physiotherapists and their impact on physiotherapists' careers (Snodgrass et al 2003). The main aim of this study was to determine the lifetime and current prevalence of thumb problems in a national sample of Australian physiotherapists. The second aim was to investigate the nature of thumb problems and the factors associated with them.

Method

Design This study used a cross-sectional design. A purpose-designed, self-administered questionnaire was mailed to each participant with a covering letter and reply paid envelope. A reminder letter was sent to slow responders. To ensure confidentiality, each questionnaire was allocated a number corresponding to names on a master list. Non-respondents were mailed a brief questionnaire to ascertain

the prevalence of thumb problems. Ethical approval was obtained from the Human Research Ethics Committee of the University of South Australia. Return of the completed questionnaire was taken to represent informed consent.

Participants Using a random numbers table, a sample of approximately 10% of physiotherapists registered to practise in Australia was compiled from lists obtained from the Physiotherapy Registration Boards of each Australian state and the Northern Territory. Physiotherapists with overseas addresses were excluded. A sample size of 10% of registered Australian physiotherapists was deemed sufficiently large to provide a representative but practicable sample.

Outcome measures A questionnaire was designed specifically for this study; its development involved reviewing questionnaires used in similar research, informal discussions with colleagues, formal focus groups, and three pilot studies. The questionnaire included both open and closed questions. General questions covered demographic information, area of practice, hours worked per week, and years worked as a physiotherapist. Thumb problems were defined as pain, ache, discomfort, instability, weakness, and/or triggering. Specific questions about thumb problems covered thumb affected, symptoms, onset of symptoms, treatment sought, relevance of work-related factors, and joint hypermobility (see Appendix 1 on the eAddendum for full questionnaire). A limited test-retest reliability study was undertaken by posting a second questionnaire to a randomly selected sample of 32 respondents (> 1% of the total sample), two months after return of the initial questionnaire. Fourteen (44%) participants returned the second questionnaire. Percentage agreement between responses for each question

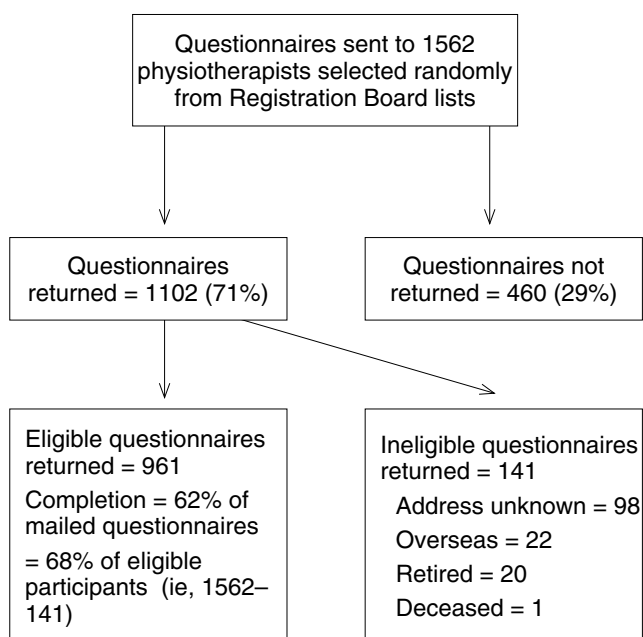


Figure 1. Flow of participants through the study.

was calculated. Complete agreement was achieved for 265 (78%) of the total of 342 responses. For questions where incomplete agreement was found, there were no instances where the level of disagreement was deemed to be major. Importantly, questions addressing the main outcome (ie, presence/absence of thumb problems) had 100% agreement. Overall, this rate of agreement was considered to represent a satisfactory level of reliability considering the complexity of the questionnaire.

Data analysis Data were analysed descriptively. Chi Square analyses were used to assess the association between thumb problems and selected variables. Where a significant association was found ($p < 0.05$), odds ratios (OR) were calculated.

Results

Flow of participants through the study Questionnaires were sent to 1562 physiotherapists which is 11% of the 14 722 physiotherapists registered to practise in Australia in 2000 according to APA reporting of Registration Board figures at that time. Figure 1 illustrates the flow of participants that resulted in 961 completed questionnaires being used in data analyses.

Outcomes Table 1 presents the demographic characteristics and work status of the 961 respondents. The mean age (SD) of the respondents was 39 years (10). Of the 961 respondents, 628 (65%) reported having had a problem with their thumbs at some point in their life (ie, lifetime prevalence), and 394 (41%) respondents reported current thumb problems (ie, current prevalence). Table 2 presents the prevalence of thumb problems according to current area of practice, hours worked per week, and years worked in current area. In most areas of practice, respondents who reported thumb problems outnumbered those without problems, with the highest percentage of thumb problems seen in respondents who worked in orthopaedic outpatients (75%).

Table 3 presents the gender, thumb affected, symptoms,

Table 1. Demographic characteristics and work status of the 961 respondents.

	Number (%)
Gender	
Female	746 (78)
Male	215 (22)
Age (yr)	
20–29	151 (16)
30–39	381 (40)
40–49	278 (29)
50–59	98 (10)
60–69	43 (5)
70–79	4 (0.4)
Missing data	6 (1)
Handedness	
Right	860 (90)
Left	92 (10)
Ambidextrous	8 (1)
Missing data	1 (0.1)
Work status in the past 12 months	
Full time	588 (61)
Part time	192 (20)
Sessional/casual	44 (5)
Other	121 (13)
Missing data	16 (2)
Years worked as a physiotherapist	
< 1	1 (0.1)
1–5	103 (11)
6–10	265 (28)
11–20	326 (34)
> 20	260 (27)
Missing data	6 (1)

onset of symptoms, and treatment sought for the 628 respondents who reported thumb problems. Pain was the most common symptom (90%). Thumb problems most often affected females (76%), involved both thumbs (58%), and were of insidious onset (84%), with just over half of those affected (52%) having sought treatment. Almost one in five (19%) had changed their field of practice as a result of thumb problems, whereas only 4% had thumb problems sufficiently symptomatic to make them leave the profession. Most (80%) indicated that thumb problems were caused or exacerbated by physiotherapy practice. Table 4 shows the relevance of work-related factors to thumb problems. A high, repetitive workload and performing passive accessory movements or soft tissue techniques were the work-related factors most commonly associated with thumb problems.

Participants were questioned about hypermobility of their elbows, knees, ankles, and/or metacarpophalangeal joint of the little fingers. Individual joint hypermobility was uncommon (< 10% in any joint) and the prevalence of generalised joint hypermobility (Grant 1986) even more uncommon (4%). Participants were also questioned about hypermobility of the thumb using diagrams and

Table 2. Prevalence of thumb problems for the 961 respondents according to their current area of practice, hours worked per week, and years worked in current area of practice.

	Total respondents	Respondents who reported thumb problems
	Number	Number (%*)
Current area of practice		
Orthopaedic outpatients	428	321 (75)
Inpatients	104	62 (60)
Rehabilitation	94	53 (56)
Other	80	56 (70)
Paediatrics	69	36 (52)
Aged care	54	26 (48)
Non-physiotherapy work	37	22 (60)
Not employed/retired	33	19 (58)
Administration	25	17 (68)
Women's health	25	13 (52)
Education	11	2 (18)
Missing data	1	0 (0)
Hours worked per week		
0	83	52 (63)
1-10	146	88 (60)
11-20	224	136 (61)
21-30	116	79 (68)
31-40	273	188 (69)
41-50	80	55 (69)
51-60	28	23 (82)
61-70	4	2 (50)
> 70	3	3 (100)
Missing data	4	2 (50)
Years worked in current area		
< 1	124	79 (64)
1-5	320	215 (67)
6-10	239	150 (63)
11-20	215	137 (64)
> 20	63	47 (75)

*% of respondents who reported thumb problems relative to number of respondents in each category

accompanying text to specify carpometacarpal and metacarpophalangeal joint testing positions. Active extension (in a non-weight bearing position) of more than 30 deg was considered to represent hypermobility. Hyperextension of the thumb interphalangeal joint with metacarpophalangeal and carpometacarpal joints in extension was more common (21%) than that of the metacarpophalangeal joint with the carpometacarpal joint in extension (8%) or flexion (7%). An inability to stabilise the thumbs during the performance of physiotherapy techniques was reported by 294 respondents (31%), with the metacarpophalangeal joint most commonly affected (31%), followed by the interphalangeal (29%) and the carpometacarpal joint (11%). More than half of the respondents who reported a thumb problem (55%) related it to thumb hypermobility or instability.

Table 3. Gender, thumb affected, symptoms, onset of symptoms, and treatment sought for the 628 respondents who reported thumb problems.

	Number (%)
Gender	
Female	474 (76)
Male	154 (25)
Thumb affected	
Dominant thumb	221 (35)
Non-dominant thumb	38 (6)
Both thumbs	361 (58)
Missing data	8 (1)
Thumb symptoms*	
Pain	568 (90)
Instability	138 (22)
Weakness	64 (10)
Stiffness	30 (5)
Other	19 (3)
Triggering	2 (0.3)
Missing data	23 (4)
Onset of symptoms*	
Specific injury	116 (19)
Specific injury related to work as a physiotherapist	26 (4)
Insidious onset	527 (84)
Insidious onset related to work as a physiotherapist	500 (80)
Treatment sought	
Yes*	328 (52)
Taping	203 (32)
Medication	94 (15)
Stabilising exercises	87 (14)
Splinting	82 (13)
Massage	42 (7)
Surgery	11 (2)
Injection	4 (1)
No	234 (37)
Missing data	66 (11)

*more than one answer allowed

A significant association was found between the presence of thumb problems and the following factors: gender ($\chi^2 = 4.82, p = 0.03$), current area of physiotherapy practice ($\chi^2 = 50.75, p < 0.001$), the 'hands-on' activities of manual therapy ($\chi^2 = 51.37, p < 0.001$), trigger point therapy ($\chi^2 = 32.33, p < 0.001$), massage ($\chi^2 = 30.66, p < 0.001$), administration ($\chi^2 = 18.13, p < 0.001$) and 'other' ($\chi^2 = 15.66, p = 0.001$). A significant association was found between the absence of thumb problems and manual handling in neurology ($\chi^2 = 14.65, p = 0.002$). A significant association was also found for thumb problems and little finger hypermobility ($\chi^2 = 5.47, p = 0.02$), hyperextension of the metacarpophalangeal and interphalangeal joints of the thumb ($\chi^2 = 10.47$ to $18.58, p \leq 0.001$), and an inability to stabilise the joints of the thumbs during physiotherapy techniques ($\chi^2 = 75.61, p < 0.001$). The factors that were *not* significantly associated with thumb problems were: age, handedness, hours worked per week, years worked in current area of practice, generalised joint

Table 4. Work-related factors and their relevance to thumb problems for the 628 respondents who reported thumb problems.

Factor	Major/moderate relevance Number (%)	Minor/no relevance Number (%)	Missing data Number (%)
Performing the same task over and over	539 (86)	66 (11)	23 (4)
Increasing thumb use	524 (83)	77 (12)	27 (4)
Treating a large number of patients per day	475 (76)	130 (21)	23 (4)
Performing passive accessory movements	469 (75)	111 (18)	48 (8)
Performing soft tissue techniques	439 (70)	150 (24)	39 (6)
Continuing to work when thumb is injured	431 (69)	169 (27)	28 (5)
Working at or near physical limits	351 (56)	242 (39)	35 (6)
Not taking enough rest breaks during the day	305 (49)	286 (46)	37 (6)
Inadequate thumb injury prevention training	249 (40)	337 (54)	42 (7)
Using a wide grip	206 (33)	388 (62)	34 (5)
Performing passive physiological movements	174 (28)	383 (61)	71 (11)
Writing	110 (18)	486 (77)	32 (5)
Using scissors	69 (11)	529 (84)	30 (5)
Using lateral pinch	49 (8)	548 (87)	31 (5)

pathology, generalised joint hypermobility, and the 'hands-on' activities of respiratory care, passive exercises, manual handling—orthopaedics and splints. The OR for factors that were significantly associated with thumb problems are shown in Table 5. An inability to stabilise the thumbs during the performance of physiotherapy techniques generated the highest OR, with respondents who were unable to stabilise their thumbs 4.2 times more likely to have thumb problems than those who could.

Less than one-third of the 961 respondents (29%) had received advice about avoiding/minimising the risk of injury to their thumbs as a result of their physiotherapy practice. However, the majority (96%) considered that students should be warned about the potential risk of thumb problems.

One hundred and sixty-one of the 460 non-respondents (35%) returned the brief questionnaire. Half of these (50%) reported thumb problems at some point in their life, comparable to the lifetime prevalence found for respondents to the full questionnaire (65%).

Discussion

The questionnaire completion rate of 68% was considered acceptable, given the resultant sample size and in comparison to previous studies in this area (Bork et al 1996, Caragianis 2002, Cromie et al 2000, Glover et al 2005, Holder et al 1999, Reglar and James 1999, Wajon and Ada 2003, West and Gardner 2001). The characteristics of the participants were comparable to those physiotherapists participating in previous similar research (Bork et al 1996, Caragianis 2002, Cromie et al 2000, Holder et al 1999, Reglar and James 1999, Wajon and Ada 2003, West and Gardner 2001), and representative of the Australian population of physiotherapists according to workforce data for the year 2000 (Australian Institute of Health and Welfare 2001).

The lifetime (65%) and current (41%) prevalence of thumb problems falls within the range of thumb/upper limb problems reported previously in physiotherapists (23–83%)

(Bork et al 1996, Caragianis 2002, Cromie et al 2000, Glover et al 2005, Holder et al 1999, Reglar and James 1999, Wajon and Ada 2003, West and Gardner 2001). Direct comparison of results is difficult given the variation in the designs, definition of thumb problems, and methodologies of these studies.

In terms of risk factors for developing thumb problems, the current study found that the prevalence of thumb problems was significantly higher in males. The reason for this was unclear, but it may be that males are comparatively over-represented in the orthopaedic outpatient area of practice, thus spending more time performing manual therapy techniques and increasing the risk of thumb problems. Although Cromie et al (2000) reported similar findings, other studies did not find gender a risk factor for thumb pain/discomfort (Caragianis 2002, Snodgrass et al 2003, Wajon and Ada 2003). While age was not associated with a higher risk of thumb problems in either this study or that of Wajon and Ada (2003), Cromie et al (2000) found that younger physiotherapists reported significantly more thumb pain/discomfort than older physiotherapists. The area of practice associated with the highest risk of thumb problems was orthopaedic outpatients (OR = 3.2). Although not directly comparable, Cromie et al (2000) found that physiotherapists working in private practice reported significantly more pain/discomfort in various body areas (including thumbs) than those working in other areas. In the current study, working in the area of administration was also associated with a relatively high risk (OR 2.3) although the reason was not clear.

In the current study, performing manual therapy, trigger point therapy, and massage all increased the risk of thumb problems. Similar findings were reported by Bork et al (1996) and Cromie et al (2000). Indeed, Cromie et al (2000) found that performing manual orthopaedic techniques and mobilisation/manipulation within the previous 12 months generated OR of 5.5 and 7.7 respectively for the development of thumb pain/discomfort. The high, repetitive workload that was associated with thumb problems in the

Table 5. Odds ratios (95% CI) of thumb problems for gender, current area of practice, 'hands-on' physiotherapy activities, joint hypermobility, and inability to stabilise the joints of the thumb during physiotherapy.

Gender	
Males	1.5 (1.0 to 2.0)
Current area of practice*	
Orthopaedic outpatients	3.2 (1.8 to 5.8)
Inpatients	1.6 (0.8 to 3.1)
Rehabilitation	1.4 (0.7 to 2.7)
Other	2.5 (1.2 to 5.2)
Paediatrics	1.2 (0.6 to 2.4)
Aged care	1.0 (N/A)
Non-physiotherapy	1.6 (0.7 to 3.7)
Not employed/retired	1.5 (0.6 to 3.5)
Women's health	1.2 (0.5 to 3.0)
Administration	2.3 (0.9 to 6.2)
'Hands-on' physiotherapy activities#	
Manual therapy (% of time spent)	
1–30%	2.3 (1.7 to 3.2)
31–60%	3.4 (2.3 to 5.1)
61–100%	3.1 (1.8 to 5.1)
Trigger point therapy	2.3 (1.7 to 3.0)
Massage	2.1 (1.6 to 2.8)
Manual handling in neurology	0.8 (0.6 to 1.0)
Administration	1.9 (1.3 to 1.7)
Joint hypermobility	
Hyperextension of little finger MCP joint	2.0 (1.1 to 3.6)
Hyperextension of thumb MCP joint with CMC joint in extension	2.6 (1.5 to 4.5)
Hyperextension of thumb MCP joint with CMC joint in flexion	2.4 (1.4 to 4.2)
Hyperextension of thumb IP joint with MCP and CMC joints in extension	2.2 (1.5 to 3.1)
Inability to stabilise joints of thumb	4.2 (2.9 to 5.9)

*OR were calculated in comparison to the 'aged care' category, as this category had the lowest proportion of respondents who reported thumb problems. An additional category of education was not analysed because of too few respondents. #OR were calculated in comparison to the 0% category. For the non manual therapy 'hands-on' activities, the '% of time spent' categories were dichotomised as 0% or > 0% due to small numbers in some cells. CMC = carpometacarpal, MCP = metacarpophalangeal

current study was also found by Cromie et al (2000) and West and Gardner (2001). While thumb hypermobility and an inability to stabilise the thumb joints while performing physiotherapy techniques increased the risk of thumb problems in the current study, the only previous study investigating these particular risk factors found that physiotherapists with thumb pain had significantly higher thumb carpometacarpal joint mobility compared to those without thumb pain (Snodgrass et al 2003).

No attempt was made to measure the construct validity of the questionnaire in view of its length and complexity, and while test-retest reliability was addressed this involved a limited sample. The cross-sectional design means that no

definitive conclusions can be drawn regarding the cause/effect of thumb problems due to work-related factors, and the effectiveness of treatment strategies cannot be evaluated. Some questions required respondents to self-assess joint hypermobility and while the validity of doing this was not tested, it was assumed that physiotherapists would be capable of performing such an assessment. While the nature of the study necessitated leading questions regarding work-related factors, every attempt was made to minimise response bias by including non work-related factors, and open ended questions allowing respondents to comment.

Based on these findings, it is recommended that the potential for thumb problems in physiotherapists, including possible risk factors, should be discussed in undergraduate and work place settings. If physiotherapists choose to work in an area of high thumb usage, particularly if they have unstable or hypermobile thumb joints, they should consider modifying their work practices to reduce repeated weight transmission through the thumb joints. Further research is needed to investigate whether modification of work practices can reduce the prevalence of thumb problems, and to evaluate the effectiveness of interventions.

In conclusion, in these 961 Australian physiotherapists, the lifetime and current prevalence of thumb problems was 65% and 41% respectively. Factors that significantly increased the likelihood of having thumb problems included: being male; working in orthopaedic outpatients; using manual therapy, trigger point therapy or massage; having hypermobility of the thumb joints, and an inability to stabilise the thumb joints while performing physiotherapy techniques. Almost one in five physiotherapists who reported thumb problems had changed their area of practice and 4% had left the profession as a result of their thumb problems.

eAddendum Appendix 1 available at www.physiotherapy.asn.au/AJP

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Statement regarding registration of clinical trials from the Editorial Board of *Australian Journal of Physiotherapy*

This journal is moving towards requiring that clinical trials whose results are submitted for publication in *Australian Journal of Physiotherapy* are registered. From January 2008, all clinical trials submitted to the journal must have been registered prospectively in a publicly-accessible trials register. We will accept any register that satisfies the International Committee of Journal Editors requirements. Authors must provide the name and address of the register and the trial registration number on submission.