

Archived at the Flinders Academic Commons

<http://dspace.flinders.edu.au/dspace/>

Copyright (2003) American Physical Society. This article may be downloaded for personal use only. Any other use requires prior permission of the author and the American Physical Society.

The following article appeared in Massy-Westropp, N., Massy-Westropp, M., Rankin, W., & Krishnan, J., 2003. Metacarpophalangeal arthroplasty from the patient's perspective. *Journal of Hand Therapy*, 16(4), 315-319, *and may be found at* doi:10.1197/S0894-1130(03)00157-1.

Metacarpophalangeal Arthroplasty from the Patient's Perspective

Nicola Massy-Westropp, BAppSc (OT),
MHealth, CHT
Matthew Massy-Westropp, BAppSc (OT)
Wayne Rankin, BAppSc, MAACB, PhD
Jegan Krishnan, MBBS, PhD, FRACS
*Flinders Medical Centre
Bedford Park, Australia*

Surgical replacement of the second to fifth metacarpophalangeal (MCP) joint was first described in 1959.¹ Since then, the efficacy of MCP arthroplasty has been investigated by applying objective and subjective assessments.

Studies using objective assessments have generally assessed the technical success of the surgery, assessing aspects such as joint alignment,² periprosthetic effects such as bone resorption,³ implant loosening,⁴ fracture,⁵ functional outcomes such as range of motion and pinch and grip strength,⁶ and postoperative complications such as infection or silicone lymphadenopathy.⁷ Some studies have reported patients' performance in hand assessments.⁸⁻¹⁰

Subjective assessments for the evaluation of MCP arthroplasty have addressed patient perceptions of hand pain, function, and appearance. For example, Synnott et al.¹⁰ asked patients to complete pre- and postoperative visual analog scales for pain and to rate their hand function from 0% to 100% postoperatively. Mannerfelt and Andersson¹¹ asked patients to grade their pain from "none" to "pain at rest preventing activity" and whether they had better precision grip postoperatively. Other hopes and experiences were not reported. The aim of this study is to report what

ABSTRACT: The results of metacarpophalangeal (MCP) arthroplasty have been measured by objective measures and, to a lesser extent, subjective measures. The aim of this study was to understand patients' goals for MCP arthroplasty and the changes that occurred for them after surgery. Twenty of 24 patients reported that their MCP arthroplasty was successful because their function, pain, or hand appearance improved after the surgery. Functional changes related to how an activity was performed rather than new abilities being enabled by the surgery. There are many qualities to changes in pain and function, which closed-ended questions would not capture. Patients may not have attempted all normal activities within the first four postoperative months; therefore, functional outcomes must be measured after four months. Concurrent surgical, pharmaceutical, and therapy interventions also change patients' function, making the exact effects of the MCP arthroplasty unclear.

J HAND THER. 2003;16:315-319.

patients had hoped to achieve from MCP arthroplasty and what they thought was changed by their surgery.

METHODS

Subjects were recruited from three teaching hospitals in Adelaide, South Australia. Approval for the study was obtained from the ethics committee of each institution. Plastic surgeons, orthopedic surgeons, and occupational therapists identified patients who had had MCP arthroplasties in the period between four months and four years before beginning the study.

Informed consent was obtained from all subjects; none were offered payment for participation. Subjects were interviewed in their homes, whenever possible, or in the research therapist's office; those in remote areas were interviewed using teleconference facilities. Themes raised and the number of points raised within each theme were coded and entered into SPSS (version 10, Chicago, IL). Chi-square analysis ($p < 0.05$) was performed to determine whether the location of the interview or the teleconference style interview affected the content of the interviews.

No sample size was set because the intent of the study was to explore a wide range of experiences from adult patients of different ages, genders, and backgrounds.¹² The sample was considered adequate when no new findings were being observed.¹³

The interview started with the researcher asking subjects to describe why they decided to have their

The Department of Orthopaedic Surgery, Flinders Medical Centre, and Repatriation General Hospital, South Australia, supported this work through a National Medical Research Council Grant.

Correspondence and reprint requests to Nicola Massy-Westropp, BAppSc (OT), MHealth, CHT, 20 Barr Smith Avenue, Myrtle Bank, 5064, Australia; e-mail: <mwestropp@picknowl.com.au>.

doi:10.1197/S0894-1130(03)00157-1

joints replaced and then what changed after the surgery. It then took a semistructured format in which the interviewer had a flexible “interview schedule” (Figure 1); questions were asked only if the patient did not volunteer the answer in the discussion. Established techniques to clarify meanings and gain more detail were used.¹³ For example, if a patient said, “after the operation my hand still hurts,” the patient would be asked “where does it still hurt?” All patients were able to clarify their answers; for example, they would point to the base of their thumb.

To indicate the completeness of the interviews, six patients were randomly selected and telephoned on the day after the interview to ask if they could add to the information they had given during the interview. Interviews were taped and transcribed verbatim except when identifying features were omitted. The themes were written as a heading (column 1 of Table 1) and the specific experiences were added (column 2 of Table 1) for each patient.

The research therapist (NMW) and a second occupational therapist (MMW) separately analyzed three randomly chosen transcripts for reliability of interpretation.^{14,15} The therapists independently examined transcripts for general topics that arose and then for specific experiences to do with that topic. The themes and experiences were coded and compared, and the percentage of agreements was calculated.

How long have you had rheumatoid arthritis?
Do you have other conditions that affect your hands?
Hand dominance
Hand of surgery Year of surgery
Digits operated
Why did you decide to have the surgery?
What were you hoping to change by having the surgery?
Did you find any change in your hand pain after the surgery?
Was there change in how bad the pain in your hand felt?
Was there change in how often the pain was there in your hand?
Was there change in the amount of medicine you had to take for pain in your hand?
Could you do different things because the pain in your hand changed?
Is there anything that did not change after the surgery that you would have liked?
Would you have the surgery again?
Is there anything else that you can think of that changed after your hand surgery?
May I call you tomorrow to check whether you remembered anything else?
For the areas of work, cleaning the house, gardening, cooking, shopping, using money, self-care, doing the laundry, hobbies/pastimes;
How important is that to you?
Did that change after the surgery?

FIGURE 1. The interview schedule.

RESULTS

Thirty-five patients were identified as having had MCP arthroplasties in the previous four years. Of these, 21 women and three men consented to participate. All were aged 60 to 75 years with the exception of one woman who was 38 years. The gender ratio and age range are similar to those of previous studies.^{5,9} All patients lived in the community. Those who lived alone received assistance in some home duties and dressing from visiting family or paid caregivers. Educational levels varied from basic primary to tertiary with past careers varying from unskilled to skilled professional. Three were actively employed at the time of the interview.

Fourteen patients were interviewed in their homes, two in the office of the researcher, and eight distant patients from their homes by teleconference. Patients who were interviewed in the office mentioned significantly ($p < 0.05$) more points about their embarrassment and how their hand was before surgery. Other than this possible artifact, there were no differences in the themes raised between the locations where interviews were held.

Interviews took 30 to 90 minutes to complete. Few patients required prompts to describe in detail the changes that occurred in their hands after their MCP arthroplasty. Patients were not asked for “proof”¹³; yet many sought to corroborate their statements by showing the researcher their finger motion and what they could lift. Some patients insisted on trying to open bottles and even inflict pain on their joints to show the researcher that they were pain-free, whereas others asked a family member to share their observations.

Reliability of interpretation from transcripts was good (74%). Themes were at times named differently by the therapists, but the patients’ specific experiences were interpreted the same way. The six patients who were telephoned after the interview may have repeated information from their interview but none had new information to add to their transcripts.

Each patient stated one or more reasons for having his or her joint replacement; to improve function was the most common. Although the patients’ reasons for surgery mostly fell into themes of improving function, decreasing pain, and improving appearance, the specific details of their goals differed, as is illustrated in Table 1. Twenty patients considered their surgery a success and 18 would repeat it. The four patients who described their surgery as a failure shared the goals of pain relief, improved hand function, and appearance. Three received full pain relief and one partial pain relief after surgery, two achieved cosmetic improvement, but none felt that their function had improved. Two patients who had achieved their primary goal of

TABLE 1. Patients' Reasons for Surgery

<i>Broad Reasons for Surgery</i>	<i>Specific Aspects (Number of Patients Who Stated This Reason)</i>
Function	To be able to open my hand (4) To use it (2) To have one good hand with strength in it (1) To shake hands (2) To use a keyboard for work (1)/letters (1) To be able to open up my hand around a cup (1) To stop getting it caught in the sail ropes (1) To eat better (1)/hold a knife (1)/eat out better (1) To stop being clumsy (1) To be efficient (1) To hold things better (4)
Pain relief	To do needlepoint without pain (1) To have some joints in my body pain-free (1) To reduce pain (5) and swelling (2) So that I wouldn't knock it on everything and scream (1) To be able to shake hands without it hurting (1)
Doctor suggested surgery	He said to have it done so it wouldn't get worse (1) Might lose function I have now (1) He said it would be a good idea (11)/the solution (1) He said it would straighten it up (1) He offered two times (4)/he offered three times (1) He said I'd get 75% of the motion back (1) The knees and elbows he did worked, so why not? (1)
Prevention	To stop the fingers going over further (1) To straighten the hand before it was too late to straighten it (2)
Appearance	To straighten it up (3) So I could put it out to shake hands (1) When I saw a photo with my hand in it, I was horrified and that made me look into it (1) I used to have to hide it (2) It looked deformed (2)/disgusting (1)/ugly (1) People would stare at my hands or ask about them and I would cry (2)
To reduce medication	It was my most painful joint. . .the medicine gave me a stomach ulcer, and I wanted to get off the medication (1)

pain relief still deemed the surgery to be a failure that they would not repeat because they felt their grip had decreased and function had not changed.

Three main themes of pain, function, and hand appearance emerged from the patients' experiences after surgery. Specific experiences are detailed in Table 2.

DISCUSSION

Most changes in function were not described simply as "not able to" before the surgery and "able to" after the surgery. Instead, patients described a change in the quality of how each activity was performed. For example, the act of fastening buttons became "a little quicker" for one patient and for another it became "pain-free," whereas another found buttons "harder to grasp" after the surgery. Another patient found that she could garden before the surgery and after the surgery, but she could garden longer and free of pain after the surgery. When patients were probed for the reason for the

changes, nonsurgical factors such as splints, adaptive equipment, and medication were also credited with assisting improved postoperative hand function. Patients described changes in the level of difficulty, pain, and ease of activities as a result of MCP arthroplasty, suggesting that closed-ended question such as "can you dress yourself?" would miss changes in *quality* of the activity.

The goals of increased function, decreased pain, and improved hand appearance were shared by patients in this study, but as Table 1 illustrates, the specific aspects of their goals differed. The four patients who described their surgery as a failure were not different from the others in their goals for pain, function, and improved hand appearance. All four received pain relief from their surgery, two of the four achieved cosmetic improvement, but none felt that their function had improved. Two patients who had named pain relief as their primary goal, and had achieved that goal, still deemed the surgery to be a failure that they would not repeat because their function did not increase and they felt that their grip had decreased. These patients' experiences support

TABLE 2. Changes Reported by Patients after MCP Arthroplasty

<i>Theme</i>	<i>Specific Experience (Number of Patients Who Stated This)</i>
Function	<p>My hand function improved (17) did not change (3) was better before (4)</p> <p>My hand strength did not change (5) is stronger now (7) is weaker now (11) The finger with the broken implant is weak (1)</p> <p>The knuckles open better now (4) open and close better (3) can't make a fist now (7) move the same (1) feel stiffer now (2) I can't tell if it's fingers or knuckles moving (2)</p> <p>I think he put the implants in upside down because they move in the wrong direction (1)</p> <p>It is embarrassing when you are slow to handle money, when you drop things or ask for help (5)</p> <p>I can hold a cup now (3)</p> <p>I dislike asking for help (5) but I still have to (4)</p> <p>I am more independent after the surgery (2)</p> <p>I still cannot grasp small coins, pieces of paper, needles (9)</p> <p>I still cannot cut hard food with a knife (3)</p> <p>I have adapted how I lift a spade, cup, box, knife (9)</p> <p>I use special equipment to do things now (5)</p> <p>Other reasons why I don't drive, do gardening, sew, cook; or lift grandchildren are because of: shoulder pain (4) rheumatoid foot problems (21) wrist pain (4) finger joint pain (4) thumb pain and deformity (2) back injury (2) poor vision (2) leg amputation (1) finger amputation (1) age, I'm 27 going on 28! (1)</p> <p>I am now able to shake hands once more (2)</p> <p>Shaking hands still hurts (3)</p>
Pain	<p>There is no knuckle pain now (11)</p> <p>There is still pain in that wrist or finger joints (12)</p> <p>There was continual dull, nagging pain (10)</p> <p>The pain was long gone by the time I had the surgery (6)</p> <p>The knuckles hurt now only if I "overdo" it (4)</p> <p>Even though the rest of the hand hurts, it's great to have four joints that don't hurt (2)</p>
Appearance	<p>Now it looks "better," "normal," "straight" (22)</p> <p>It doesn't look any different now (2)</p> <p>People would stare at my hand and now they don't (4)</p> <p>I used to hide my hand before the surgery, now I don't (4)</p> <p>I still hide my hand (1)</p>

the need for preoperative discussion and formation of goals and counseling as to the likely outcomes of this large surgery and long rehabilitation.

Twenty-one patients stated that their hand pain had decreased in severity and duration as a result of MCP arthroplasty, but only five described behavioral changes in their activities, sleep, and use of pain relief as a result of the surgery. These experiences suggest that more information on outcome can be captured by pain assessments that address the intensity, duration, frequency, and behavioral effects of pain.

Grip and pinch ability and grip and pinch strength were separate abilities from the patients' perspective. All but one reported improvement in the ability to

hold large objects, but holding small items such as pens or coins was worse or not improved for nine patients after surgery. When asked why, many said that they could no longer make a tight fist after surgery, although they could open their hand and grasp larger things. Changes in grip strength were not uniform because 11 patients said that their strength had decreased after surgery; six of these still described functional improvement. To capture all of these effects, hand motion, strength, and the ability to handle objects of various sizes must be investigated.

Seventeen patients described increased function, but only two had increased independence after their surgery. Those who improved in hand function still

required special equipment and assistance after the surgery. Despite continued dependence or use of equipment, these patients still regarded the surgery as a success.

Metacarpophalangeal deformities were not the sole reason for patients' disabilities. All but three patients had rheumatoid foot conditions that precluded activities such as gardening. One described back pain, rather than hand problems, as the reason she could not lace her shoes. The majority of patients had undergone other hand surgeries within the ten years before their interviews, one having had 17 hand surgeries. This number of surgeries, the progression of their rheumatoid arthritis, and the medication changes that many had made caused many functional changes in their lives. Further questioning is required to elicit the specific cause of each improvement.

Two patients had their MCP arthroplasties four months before the interviews. They had not yet tried many activities, they had been told by their doctor not to do heavy activities, and one still reported pain in the operated joints. It was too early to appreciate the full effects of the surgery at four months, although this is when many patients are reported as discharged from therapy,¹⁶ suggesting that pain and function should be assessed more than four months after MCP arthroplasty.

CONCLUSIONS

The quality of change is regarded as functional improvement by patients with rheumatoid arthritis. Closed-ended questions about patients' abilities can miss changes in the *quality* of how the activity is performed. Goals of increased function, decreased pain, and improved hand appearance may be shared by patients in this study, but the specific aspects of their goals differ. Grip and pinch strength and the ability to handle objects of various sizes are separate abilities that do not equally relate to how patients view functional success. Questioning is required to elicit the specific cause of each change in this population. Pain and function should be assessed

more than four months after MCP arthroplasty. There are aspects of duration and quality of pain as well as its behavioral effects. All of these can be affected by MCP arthroplasty, as well as pain severity.

REFERENCES

1. Brannon EW, Klein G. Experiences with a finger joint prosthesis. *J Bone Joint Surg [Am]*. 1959;41:87-102.
2. Sollerman CJ, Geijer M. Polyurethane versus silicone for endoprosthetic replacement of the metacarpophalangeal joints in rheumatoid arthritis. *Scand J Plast Reconstr Hand Surg*. 1999;30:145-50.
3. Wilson YG, Sykes PJ, Niranjan NS. Long-term follow-up of Swanson's silastic arthroplasty of the metacarpophalangeal joints in rheumatoid arthritis. *J Hand Surg*. 1993;18B:81-91.
4. Vahvanen V, Viljakka T. Silicone rubber implant arthroplasty of the metacarpophalangeal joint in rheumatoid arthritis: a follow-up study of 32 patients. *J Hand Surg*. 1986;11A:333-9.
5. Bass RL, Stern PJ, Nairus JG. High implant fracture incidence with Sutter silicone metacarpophalangeal joint arthroplasty. *J Hand Surg*. 1996;21A:813-8.
6. Pereira JA, Belcher HJCR. A comparison of metacarpophalangeal joint silastic arthroplasty with or without crossed intrinsic transfer. *J Hand Surg*. 2001;26B:229-34.
7. Kircher T. Silicone lymphadenopathy with concomitant malignant lymphoma. *J Rheumatol*. 1989;16:1480-3.
8. Opitz JL, Linscheid RL. Hand function after metacarpophalangeal joint replacement in rheumatoid arthritis. *Arch Phys Med Rehabil*. 1978;59:160-5.
9. Rothwell AG, Cragg KJ, O'Neill LB. Hand function following silastic arthroplasty of the metacarpophalangeal joints in the rheumatoid hand. *J Hand Surg*. 1997;22B:90-3.
10. Synnott K, Mullett H, Faull H, Kelly EP. Outcome measures following metacarpophalangeal joint replacement. *J Hand Surg*. 2000;25B:601-3.
11. Mannerfelt L, Andersson K. Silastic arthroplasty of the metacarpophalangeal joints in rheumatoid arthritis. *J Bone Joint Surg Am*. 1975;7:484-9.
12. Coyne IT. Sampling in qualitative research. Purposeful and theoretical sampling; merging or clear boundaries?. *J Adv Nurs*. 1997;26:623-30.
13. Minichiello V, Aroni R, Timewell E, Alexander L. *In-Depth Interviewing*, 2nd ed. Australia: Addison Wesley Longman Australia Pty, 1995.
14. Barbour RS. Checklists for improving rigour in qualitative research: a case of the tail wagging the dog? *BMJ*. 2001;322:1115-7.
15. Giacomini MK, Cook DJ. Users' guides to the medical literature XXIII. Qualitative research in health care A. Are the results of the study valid?. *JAMA*. 2000;284:357-62.
16. Burr N, Pratt AL. MCP joint arthroplasty case study: the Mount Vernon static regime. *Br J Hand Ther*. 1999;4:137-40.