 Acta Chir Orthop Traumatol Cech., 91, 2024, No. 3, p. 175–181
DOI: 10.55095/achot2024/017

ORIGINAL PAPER
PŮVODNÍ PRÁCE

Patient-Experience of Trapeziectomy for Trapeziometacarpal Osteoarthritis in Wide-Awake Local Anesthesia no Tourniquet, 2-Year Follow-up

Zkušenosti pacienta s trapezektomií pro rhizartrózu v lokální anestezii bez sedace a bez použití turniketu, 2 roky sledování

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ABSTRACT

PURPOSE OF THE STUDY
The purpose of this study was to assess the patient experience of trapeziectomy under WALANT for trapeziometacarpal joint (TMJ) osteoarthritis (OA) in a prospective study with 2-year follow-up.

MATERIAL AND METHODS
The study included 23 patients with TMJ OA undergoing trapeziectomy with WALANT. All patients were seen by a hand therapist preoperatively and at 3, 12, and 24 months postoperatively. At each visit, VAS pain scores, thumb range of motion, grip strength, and Disabilities of the Arm, Shoulder and Hand (DASH) score were assessed. The Picker Patient Experience (PPE-15) questionnaire was administered within 2 weeks of surgery.

RESULTS
All 23 patients completed the PPE-15 questionnaire. Their mean age was 64 years. The 21 patients who remained at the 24-month follow-up all said they would choose the same anaesthesia method again. At this follow-up, VAS pain scores, thumb range of motion, key pinch grip and DASH scores had improved significantly, while thumb opposition and hand grip strength remained largely unchanged. The majority of patients felt well informed before and during the procedure, and all patients rated pain relief as good or satisfactory. Nearly 40% of patients reported receiving inadequate information about the postoperative medications.

DISCUSSION
Patients have a positive attitude to trapeziectomy with WALANT, and seem to prefer WALANT over other methods of anaesthesia. Trapeziectomy with WALANT for TMJ OA is a safe procedure and appears to give a functional outcome similar to trapeziectomy under general anaesthesia.

CONCLUSIONS
Trapeziectomy with WALANT for TMJ OA is safe, preferred by patients and has similar clinical outcome as trapeziectomy in general anesthesia.

Key words: trapeziectomy, osteoarthritis, WALANT.

This study was funded by a grant from Örebro County Council (ALF project, grant number: 979910). The funding body played no part in the design of the study, the collection, analysis, and interpretation of data, or the writing of the manuscript.

INTRODUCTION

The wide-awake local anaesthesia no tourniquet (WALANT) technique was initially introduced by Lalonde in 2007, and has since gained popularity in hand surgery (4). WALANT has several advantages compared to surgery under anaesthesia, including the elimination of nausea, vomiting, and other unwanted side-effects of sedation. Tourniquet pain is avoided, costs are reduced, and safety is improved, particularly for patients with medical comorbidities (17, 23).

The Covid-19 pandemic led to reduced resources for surgeries under general anaesthesia in most Western countries, leading to an increase in hand surgical procedures using local anaesthesia (7, 32). WALANT has proved to be successful for common procedures such as flexor tendon repair, carpal tunnel surgery, trigger finger release, Dupuytren's disease, and various bony procedures (32, 37). Today, distal radius fractures and forearm fractures can be safely operated with WALANT (3).

The trapeziometacarpal joint (TMJ) is the second most common site affected by osteoarthritis (OA) of the hand, after the distal interphalangeal joint, and is a common cause of pain in postmenopausal women (13, 14). If non-operative treatment fails, surgery can be indicated if functional limitations and pain become debilitating and hamper the patient's daily activities (25, 26).

Several procedures are possible: trapeziectomy with or without reconstruction or tendon interposition, TMJ arthrodesis, and TMJ arthroplasty (6, 9, 38). The use of WALANT has also been described in surgical treatment of trapeziometacarpal osteoarthritis (24, 28, 29). All procedures are effective in reducing preoperative symptoms, but have different advantages and drawbacks (8, 41). Trapeziectomy has a low cost and can also address a concomitant OA in the scapho-trapezial joint. A TMJ prosthesis has a higher cost but can give better short-term grip strength and range of motion (8).

A study on the patient experience of hand surgery using WALANT showed that carpal tunnel release under WALANT could give improved patient satisfaction compared to sedation and monitoring techniques (28). Another study covering 11 different hand surgical procedures found that 90% of patients would recommend the procedure to a friend (7, 36). However, to our knowledge, studies focusing on patients' experience of trapeziectomy with WALANT are sparse. The purpose of this prospective study was therefore to assess the patient experience of trapeziectomy for TMJ OA in 23 cases with a 2-year follow-up.

MATERIAL AND METHODS

This prospective study was conducted at the Department of Orthopedics and Hand Surgery at Örebro University Hospital, a tertiary referral centre in Sweden. The study was registered in the Swedish research database FoU in Sweden (www.researchweb.org.is/sverige, ref: 281059), and was approved by the Swedish Ethical

1. When you had important questions to ask a doctor, did you get the answer that you could understand?
   Yes, always **Yes, sometimes** **No** **I had no need to ask**
2. When you had important questions to ask a nurse, did you get the answer that you could understand?
   Yes, always **Yes, sometimes** **No** **I had no need to ask**
3. Sometimes in hospital one doctor or nurse will say one thing and another will say something different. Did this happen to you?
   Yes, always **Yes, sometimes** **No**
4. If you had anxieties or fears about your condition or treatmens did a doctor discuss them with you?
   Yes, completely **Yes, sometimes** **No** **I had no anxiety or fears**
5. Did doctors talk in front of you as if you weren't there?
   Yes, often **Yes, sometimes** **No**
6. Did you want to be more involved in the decisions made about your care and treatment?
   Yes, definitely **Yes, to some extent** **No**
7. Overall, did you feel you were treated with respect and dignity while you were in hospital?
   Yes, often **Yes, sometimes** **No**
8. If you had any anxieties or fears about your condition did a nurse discuss them with you?
   Yes, completely **Yes, sometimes** **No** **I had no anxiety or fears**
9. Did you find someone in the hospital staff to talk to about your concerns?
   Yes, completely **Yes, to some extent** **No** **I didn't have any concerns**
10. Were you ever in pain? Do you think the hospital staff did everything they could to control your pain?
    Yes **No**

    If yes, do you think the hospital did everything they could to control your pain?
    Yes, definitely **Yes, to some extent** **No**
11. If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?
    Yes, definitely **Yes, to some extent** **No** **No family/friends involved**
    My family/friends didn't want information **I didn't want family/friends to talk to a doctor**
12. Did doctors or nurses give your family or someone close to you all the information they needed to help you recover?
    Yes, definitely **Yes, to some extent** **No** **No family/friends involved**
    My family/friends didn't want information **I didn't want family/friends to talk to a doctor**
13. Did a member of staff explain the purpose of the medicines you were to take home in a way you could understand?
    Yes, completely **Yes, to some extent** **No** **I didn't need an explanation**
    I had no medications (go to Q15)
14. Did a member of staff tell you about medication side effects to watch for when you went home?
    Yes, completely **Yes, to some extent** **No** **I didn't need an explanation**
15. Did someone tell you about danger signals regarding your ilness or treatment to watch for when you went home?
    Yes, definitely **Yes, to some extent** **No**

Fig. 1. The 15-item Picker Patient Experience questionnaire (PPE-15).

Table 1. Eaton-Littler classification of trapeziometacarpal joint osteoarthritis (21)

Stage	Radiographic characteristics
1	Slight joint space widening (pre-arthritis), articular contours are normal, <1/3 subluxation
2	Slight narrowing of carpometacarpal joint with sclerosis, significant capsular laxity, 1/3 subluxation of the joint, osteophytes <2 mm
3	Mild narrowing of carpometacarpal joint with osteophytes, >1/3 subluxation of the joint, osteophytes >2 mm
4	Severe degenerative changes, major subluxation of the joint, very narrow joint space, cystic and sclerotic subchondral bone changes, significant erosion of the scapho-trapezial joint, pantrapezial arthritis

Review authority (ref no: 2023-05207-01). All patients gave oral and written informed consent before participation, in accordance with the Declaration of Helsinki (1). The study included patients with TMJ OA where non-operative treatments such as orthosis, physiotherapy, non-steroidal anti-inflammatory drugs, and glucocorticoid injections had failed. Patients were treated between Feb 12th 2021 and Jan 29th 2022. Preoperative radiographs were taken and then classified according to Eaton-Littler by one of the authors (Table 1) (21). All operations were conducted by hand surgeons with experience level 3–4 according to Tang (35).

All patients were seen by a hand therapist preoperatively and at 3, 12, and 24 months postoperatively. At each of these visits, they were assessed regarding VAS pain scores at rest and during activity (0–10, where 10 represents the worst pain imaginable), range of motion with thumb interphalangeal and metacarpal joint flexion/extension, thumb opposition (tip of thumb to tip of little finger), and radial and palmar abduction. Pinch grip and key-pinch grip were measured with a pinch grip meter (North Coast Medical Inc, CA, USA), and hand grip strength was measured with a Jamar Hand Dynamometer (Biometrics Ltd). All measurements were performed according to guidelines from the Swedish National Quality Registry for Hand Surgery (34). The validated Swedish translation of the DASH questionnaire was also administered to the patients (2). DASH scores range from 0 to 100, with 0 being the best result, and the minimal clinically important difference is 10.8 (12, 16).

In addition, all patients completed the Swedish version of the 15-item Picker Patient Experience (PPE-15) questionnaire within 2 weeks after the procedure (Fig. 1). The questionnaire was given to the patient after the surgery, completed by the patient at home, and then returned to the nurse removing the sutures 2 weeks after the operation. The PPE-15 questionnaire was developed in 2002 by the Picker Institute, and comprises a validated core subset of 15 items from the original Picker questionnaire that are applicable for the majority of patients (11, 18, 19). It has been found to provide a meaningful picture of patient experiences of health care. We used the Swedish version of the original Picker "inpatient survey" published in 2012, which validated the PPE-15 on 34000 patients (40). The Swedish version differs slightly from the original PPE-15 in two items: in item 5, "Did the doctors talk in front of you as if you weren't there?", "doctors" has been replaced by "the staff", and in item 9, "Did you find someone on the hospital staff to talk to about your concerns?", "someone" has been replaced by "a nurse/doctor" (Table 2).

Technique

The technique of WALANT is based on needle insertion with minimum pain and a slow injection speed throughout the injection sequence, as described by Farhangkhoee and Lalonde (10, 22). We injected 50 ml 0.5% lidocaine with 1:200,000 epinephrine, using a 27-gauge needle. We began by injecting 10 ml in the

Table 2. Median values of measurements at the preoperative, 3-month, and 24-month visits

	Preop	3 months postop	24 months postop	p-value [a]
VAS during activity	7.7	2.9	2	sig <0.001
VAS at rest	4.6	0.5	0.6	sig <0.001
ROM IP joint	41°	30°	80°	sig <0.001
ROM MCP joint	33°	40°	50°	sig <0.027
Thumb palmar abduction	44°	45°	47°	ns
Thumb radial abduction	44°	46°	47°	ns
Thumb opposition, cm	0.5	0.5	0.15	ns
Hand grip strength, kg	19.5	/	22.2	0.006
Key pinch grip, kg	3.75	/	5.5	0.006
Pinch grip, kg	3.85	/	5	0.044
DASH score	55	27.8	26	sig <0.001

[a] Wilcoxon signed rank test comparing preoperative values with values at the 24-month follow-up; sig = significant; ns = non-significant; preop = preoperative; postop = postoperative; VAS = visual analogue scale; ROM = range of motion; IP = interphalangeal; MCP = metacarpophalangeal; DASH = Disabilities of the Arm, Shoulder and Hand.

Table 3. Picker Patient Experience (PPE) questionnaire results

PPE 1	Yes, always 100%			
PPE 2	Yes, always 96%			I had no need to ask 4%
PPE 3		Yes, sometimes 13%	No 87%	
PPE 4	Yes, always 35%	Yes, sometimes 14%	No 30%	I had no anxiety or fears 21%
PPE 5		Yes, sometimes 9%		No 91 %
PPE 6	Yes, definitely 9%	Yes, to some extent 9%	No 82%	
PPE 7	Yes, always 96%		No 4%	
PPE 8	Yes, completely 62%	Yes, sometimes 4%	No 4%	I had no anxiety or fears 30%
PPE 9	Yes, completely 44%	Yes, to some extent	No 4%	I had no fears 52%
PPE 10	Yes 65%		No 35%	
	Yes, definitely (12 patients; 80%)	Yes, to some extent (3 patients; 20%)		
PPE 11	Yes, definitely 4%	My family didn't want information 57%	No family involved 30%	I didn't want my family to talk to a doctor 9%
PPE 12	Yes, definitely 4%	My family didn't want information 17%	No family involved 79%	
PPE 13	Yes, completely 79%	Yes, to some extent 4%	No 4%	I didn't need an explanation 13%
PPE 14	Yes, completely 39%		No 39%	I didn't need an explanation 22%
PPE 15	Yes, definitely 61%	Yes, to some extent 13%	No 26%	

subcutaneous fat under the planned dorsal incision, and inflating the radial side of the hand all around the trapezium. The injection sites for the trapeziectomy were completed by adding a volar digital nerve block of the thumb via the dorsal injection site. After the injection, a 30–45 minute wait was planned before starting the procedure to give the epinephrine time to have full effect.

We performed a trapeziectomy according to department routine using a straight dorsal incision with no tendon graft; this is in line with the Swedish National Guidelines for TMJ OA (30). Capsular and periosteal flaps were raised from the trapezium. After removal of the trapezium, the scapho-trapezoidal articulation was inspected. If the intraoperative findings indicated OA between the scaphoid and the trapezoid, the distal part of the trapezoid was removed using an osteotome. The joint capsule was closed using absorbable sutures. The skin was sutured using 4.0 non-absorbable sutures (Ethilon™). Postoperatively, the thumb was placed in a cast for 4–5 weeks, followed by gentle mobilization by a hand therapist and use of a removable thumb splint. Full weightbearing was allowed 10 weeks postoperatively. In our clinic, it is standard practice for hand surgery patients to take postoperative painkillers home from the clinic. Through this routine, we adjusted the amount of opioids prescribed to the actual need. We have different bags that are tailored to the diagnosis and procedure. The bag that patients in our study received corresponds to the bag that all patients undergoing surgery for CMC1 osteoarthritis receive in our Department. The bag contained 24 tablets of Paracetamol (500 mg), 3 tablets of Etoricoxib (60 mg), and 7 immediate-release Oxycodone (IR) capsules (5 mg).

RESULTS

The study included 23 patients in a prospective series, comprising 10 right and 13 left thumbs, and 4 men and 19 women. All patients completed the PPE-15 questionnaire. Their mean age was 64 years.

Two patients were lost to follow-up, and so 21 patients came to the follow-up visit with the hand therapist 24 months after the procedure. All 21 patients were asked whether they would choose the same anaesthesia method again, and all 21 answered yes and would prefer another hypothetical trapeziectomy to be performed with WALANT. Four of the 21 patients had undergone surgery on the contralateral hand under general anaesthesia before their WALANT procedure for the same diagnosis. Another two patients of the 21 have since had surgery for TMJ OA on the contralateral hand, and both chose to have the surgery with WALANT (regular anaesthesia was also offered as a choice).

Normal distribution of the data was assessed using the Shapiro-Wilks test (data not shown). As the data were non-normally distributed, statistical analyses were performed using the Wilcoxon signed rank test. Statistical significance was set at a P-value of <0.05. VAS pain scores at rest and during activity improved significantly 2 years postoperatively compared with preoperatively. The range of motion for the thumb IP joint and MCP joint improved significantly, but palmar and radial abduction, thumb opposition, and hand grip strength remained largely unchanged. Key pinch grip and DASH scores also improved significantly at the 2-year follow-up (Table 2). There were no postoperative infections and no reoperations noted during the 2-year follow-up period.

The majority of patients felt they were well informed before and during the procedure, treated with respect by the staff, and sufficiently involved in the decision-making process. All 23 patients rated pain relief as good or at least satisfactory. Approximately one third experienced no pain during or after the procedure, and the two thirds who did experience pain reported that the staff did everything possible to control the pain. Eight out of 23 patients (39%) reported not feeling sufficiently informed about the contents of the prepacked bag of postoperative analgesics given after the procedure (question 13 of PPE-15). Furthermore, 6 patients reported not feeling sufficiently informed about danger signs to watch out for after they went home (question 15 of PPE-15) (Table 3).

DISCUSSION

The present findings indicate that the patients had a positive experience of trapeziectomy under WALANT and were satisfied with the procedure. These findings are in line with a previous study on a variety of common hand surgical procedures, although that study used a modification of Lalonde's questionnaire and so the results are not fully comparable (36). Hand surgery with WALANT has enjoyed increasing popularity in recent years (20, 24, 27). Initially only used for minor procedures, indications have expanded to more extensive procedures (3).

The patients in our study expressed high satisfaction, and the majority felt they were treated respectfully and safely, well informed, and sufficiently involved in the decision-making processes. All 21 patients who attended the follow-up 24 months after the procedure said they would choose the same anaesthesia method again for the same procedure on the other hand. Indeed, four of them had previously undergone trapeziectomy with general anaesthesia on the other hand, but preferred WALANT. Another two patients underwent surgery on the other hand for the same diagnosis after their WALANT trapeziectomy, and both chose WALANT as anaesthesia method for their next trapeziectomy.

To our knowledge, there is a scarcity of questionnaires focusing on the patient experience of a procedure. The PPE-15 questionnaire is one of these tools, and one of the few that has also been validated in Swedish (40). Lalonde, who pioneered the introduction of WALANT in hand surgery, used a numerical analogue scale (0–10) to measure different components of the patient experience such as pain experience, anxiety, and satisfaction. This has the advantage of providing a numerical value, but to our knowledge lacks formal validation (7, 28). The PPE-15 questionnaire is validated and has more questions focusing on the patient experience, but has the disadvantage of lacking a summarizing numerical value (18). Another drawback of the PPE-15 is the lack of questions separating pain during the injection of local anaesthesia, during the procedure, and postoperatively.

The optimal time to complete a questionnaire on the patient experience of WALANT surgery is debatable. Another study sent out the questionnaire regarding the WALANT procedure at a minimum of 3 months (range 3–22 months) after the procedure (36). The PPE-15 questionnaire in our study was given to the patients after the surgery, completed by the patient at home, and then returned to the nurse removing the sutures 2 weeks after the operation. This timescale may have reduced recall bias, and the completion of the questionnaire at home may have reduced courtesy bias.

In our experience, tourniquet pain is a problem for many patients, and a main advantage of WALANT is the elimination of tourniquet-related pain (36). A majority of the patients in our study experienced pain during or after the procedure, but these patients also expressed that the staff did everything possible to control the pain, which is encouraging. However, the lack of a specific question separating pain during injection or during the procedure means that the results are not completely comparable to other studies using the modified Lalonde questions (36).

Our findings also indicate that there is room for improvement in our WALANT process. Nearly 40% of the patients felt they were given inadequate information about the medications prescribed postoperatively (prepacked analgesics bag). This suggests that although the postoperative pain relief routine does work, the process for handing out the prepacked bag of analgesics is not sufficient for all patients to feel well informed. Moreover, a quarter of the patients felt they had not received sufficient information about possible warning signs of a surgical complication. As a result, we have revised our discharge routines with the hope of improving patient satisfaction henceforth.

There are several options available in the surgical management of TMJ OA, and WALANT trapeziectomy with or without ligament reconstruction/tendon interposition is a commonly used option described in several articles (25, 26, 28). In this study, we decided to include only trapeziectomy with or without capsuloplasty in order to have a uniform group of patients. Recent data have suggested that patients operated with a TMJ arthroplasty may have a significant advantage postoperatively regarding strength and range of motion compared to a regular trapeziectomy in the first years postoperatively (24). For this study, we followed the current national guidelines, and cases were thus operated in accordance with the Swedish National Board of Health and Welfare's recommendation for TMJ OA, which is trapeziectomy alone, with or without capsuloplasty (39). The current state of evidence indicates this has equivalent outcome and less complications compared to trapeziectomy combined with tendon interposition, and is therefore recommended as the first choice (39).

The present findings indicate that the functional results after trapeziectomy using WALANT are comparable to those with general anaesthesia. Thumb range of motion increased significantly for both the MCP and IP

joints. DASH scores also improved significantly at the 2-year follow-up. Grip strength remained largely unchanged, while pinch grip increased significantly at the 2-year follow-up, but the clinical significance of this finding is unclear. The changes in functional outcome postoperatively are similar to the findings in trapeziectomies performed under general anaesthesia (8). VAS pain scores in our study improved significantly at the 2-year follow-up. This finding is encouraging, as pain has been described as the most important factor following wrist surgery (5).

Trapeziectomy is a common procedure for TMJ OA, and shifting from surgery under general anaesthesia to a WALANT procedure could potentially reduce the strain on anaesthesia, which increased further during the COVID-19 pandemic (31, 33). Other advantages of using WALANT for trapeziectomy include increased cost-effectiveness, elimination of postoperative pain related to the use of a tourniquet, and minimized anaesthetic risk (29). In addition, the patient is able to cooperate with the surgeon and thus can provide a real-time dynamic assessment of hand function (36). This can be particularly useful in tendon repairs, tendon transfers, and fracture surgery (15). In trapeziectomy for TMJ OA, a hypothetical advantage is the possibility to study how the TMJ articulates as the patient moves the thumb. If impingement is present and perceived by the operating surgeon to be a potential problem, a tendon interposition can be added. Lalonde has described trapeziectomy where in cases of impingement of the metacarpal during surgery, a tendon interposition is added using the abductor pollicis longus tendon strip (23). Another advantage to using WALANT for trapeziectomy is that the technique allows for on-table counselling and education of patients (7).

This study has some limitations. The series included only 23 patients, and we did not compare WALANT with other types of anaesthesia (sedation, general anaesthesia, etc.). No formal calculation was made of the cost of trapeziectomy with WALANT compared to general anaesthesia, although it seems obvious that WALANT surgery will have a lower cost because no staff are needed for anaesthesia. The attrition rate was acceptable, but we do not know what the two patients lost to follow-up thought about the WALANT technique. In the future, randomized controlled trials should be conducted to compare WALANT with general anaesthesia in hand surgery in order to clarify the differences between the methods.

CONCLUSIONS

In conclusion, trapeziectomy with WALANT for TMJ OA is a safe procedure, and can produce a functional outcome similar to trapeziectomy under general anaesthesia regarding grip strength, VAS pain scores, range of motion, and DASH scores. Patients have a positive attitude to WALANT trapeziectomy, and seem to have a preference for WALANT over other methods of anaesthesia.

Informed consent statement: *The study was performed according to the Helsinki declaration and approved by the Swedish Ethical Review Authority (reference number: 2023-05207-01).*

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