

Comparative research for surgical excision and lay-open maneuver in treatment of hand and wrist ganglion cyst

Original
Article

Yahya Kamal

Department of General Surgical, Alqureen Hospital, Ministry of Health, Zagazig Governorate, Egypt.

ABSTRACT

Target: The goal of the study was to compare the outcomes of two different approaches to treating hand and wrist ganglia: the lay-open procedure and typical surgical excision.

Patients and Methods: This study was conducted at the surgery department of the Alqureen General Hospital in Sharkia, Egypt, between January and December of 2023. This survey was completed by 40 individuals who had wrist or hand ganglions. Patients were divided into two categories based on casual distribution. Traditional surgical excision was used to treat one kind (group A), whereas a lay-open technique was used to treat the other kind (group B). Recurrences were noted during the 6-month proceedings for both.

Results: The typical surgical excision took much longer to complete (61.2 vs. 23.7 min; $P < 0.001$) than the lay-open procedure. There was a considerable variance between the two sorts with relation to the operating maneuver complexity ($P < 0.001$). Group A experienced more satisfied postoperative complications. However, when it came to wound infection and the appearance of minor postoperative discomfort, the difference between the two types was not statistically significant ($P = 0.3$). Patients in type B reported higher levels of satisfaction (90 vs. 45%; $P < 0.001$).

Conclusion: When compared with typical surgical excision for the treatment of hand and wrist ganglion cysts, the lay-open procedure appears to be preferable.

Key Words: Cyst, ganglion, lay-open, treatment.

Received: 5 January 2024, **Accepted:** 29 January 2024, **Publish:** 7 July 2024

Corresponding Author: Yahya Kamal, Msc, General Surgical Department, Alqureen Hospital, Sharia, Egypt.
Tel.: +0100 005 4641, **E-mail:** yehiakamal2023@gmail.com

ISSN: 1110-1121, July 2024, Vol. 43, No. 3: 616-623, © The Egyptian Journal of Surgery

INTRODUCTION

Benign cysts known as ganglia can be seen in many parts of the human body, usually next to a tendon, joint capsule, or tendon sheath. A thick, transparent, mucus-like fluid that hisses to the joint fluid is the substance that makes up ganglion cysts. The ganglion capsule, which is made of compressed stroma and lacks a cellular lining, may be joined to the joint capsule below by a narrow canal that functions as a one-way valve^[1].

The dorsal wrist, volar-radial wrist, dorsum of the distal interphalangeal joint, and the proximal digital flexion crease are common locations for ganglia on the hand. Ganglia may be observed at an intraosseous location where they are joined to tendons (such as the wrist's extensor tendons) or maybe a carpal boss of the second and third carpometacarpal joints^[2]. The dorsal and palmar-radial regions of the wrist are home to the wrist ganglia^[3].

The second and fourth decades of life are when ganglia are most common in females^[4]. Although the polarity in

children dissipates in less than a year, they are also well-liked by the elderly and pediatric population^[5, 6]. The causes of diffuse wrist ganglia are yet unknown. Perhaps abrupt or sneaky at first. However, 10% of cases worsen after particular traumatic experiences, and recurring mild trauma may be the root cause^[7]. They develop with activity, rupture, or diminish abruptly, and they have a negative link with carriers^[8]. They can also decrease with rest.

Clinical appearance is frequently accompanied by discomfort and a lump. The 'lump' raises worries about cancer and cosmetics. In an analysis of 50 patients with ganglion diagnoses attending an Alqureen hospital outpatient clinic, Westbrook *et al.*^[9] found that 38% of patients came primarily for cosmetic reasons, 28% thought it was cancer, 26% were in pain, and only 8% had registered hand limitation or variable sense.

A ganglion is typically suspected clinically based on a small, rounded cystic swelling that may occasionally be tense and appear hard. One physical sign of a ganglion is when the swelling's mobility is noticeably restricted by

contraction of the related tendon. Examining the lump will usually confirm this diagnosis. Transillumination of a bump in the conventional anatomical place will insure a fluid-filled cyst unless this cyst is very tiny or deep^[1].

An ultrasound scan is a technique used to reveal ganglia that may be too tiny or deeply seated to be felt^[10]. A research suggests that MRI is a sensitive and somewhat specific imaging pattern for the hidden ganglion^[11], which makes it an essential diagnostic tool. Open surgery or arthroscopic surgery may be used to remove the cyst together with its capsule and any attachments to the wrist ligaments below^[12,13]. Recurrence rates following excision vary significantly from 1 to 40% according to published data^[14,15].

Objectives:

The goal of the study was to compare the outcomes of two procedures the lay-open maneuver and typical surgical excision for treating the ganglia in the hands and wrists.

The lay-open maneuver was done by marking the site of the ganglion before anesthesia. Local infiltration anesthesia is given at the site of the ganglion.

The incision is performed according to Langer's line exclusion in regions that contain big or major vessel or nerves; the longitudinal incision is preferred.

Dissection is done until the ganglion is connected. The ganglion is opened at its roof accompanied by evacuation of its collection, holding the opened wall of the ganglion with four mosquito forceps in the crossed direction, then interrupted sutures are taken in the ganglion wall to fix it to the neighboring subcutaneous tissue or fascia without damaging any nerve, vessel, or tendon.

Four interrupted sutures are efficient in keeping the ganglia open and to inhibit its closure and reaccumulation of the fluid inside it - that is, repetition. Closing of the skin incision was done by interrupted simple or subcuticular 3/0 sutures without drain and with compression over and crepe bandage for 48 h.

PATIENTS AND METHODS:

This study was conducted from January 2023 to December 2023 at the Alqurren General Hospital in Sharkia, Egypt. For this study, 40 individuals who had wrist or hand ganglions were examined. Patients were split into

two groups at random. Group A received treatment with typical surgical excision, but group B received treatment through a lay-open procedure. Recurrences were noted during the six months that they were monitored.

Standard of inclusion

All patients above 15 years of age, coming for the first time with hand or wrist ganglion were included.

Standard of exclusion

- (1) All patients attending with recurrent ganglia.
- (2) Recognized history of wrist injury, pregnancy/breast feeding, and bleeding disorders.
- (3) Those with incomplete excision in the past.

Operative maneuver

Group A was taken local intravenous anesthesia and the tourniquet was applied to make a bloodless field, while group B was taken with local infiltration anesthesia at the site of ganglion without the necessity for a tourniquet.

The lay-open maneuver was done by contouring the site of the ganglion before taking anesthesia. Local infiltration anesthesia is taken at the region of the ganglion.

The incision is done related to Langer's line exclusion in the areas that contain great or major vessels or nerve; longitudinal incision is preferred.

Dissection is done until the ganglion is attached. The ganglion is opened at its roof accompanied by evacuation of its collection, holding the opened wall of the ganglion with four mosquito forceps in cross direction, then interrupted sutures are taken in the ganglion wall to fix it to the neighboring subcutaneous tissue or fascia without destroying any nerve, vessel, or tendon.

Four interrupted sutures are efficient to keep the ganglia opened and to inhibit its closure and reaccumulation of the fluid inside it - that is, repetition. Closing of the skin incision was done by interrupted simple or subcuticular 3/0 sutures without drain and with compression over and crepe bandage for 48 h. (Figs 1-3).

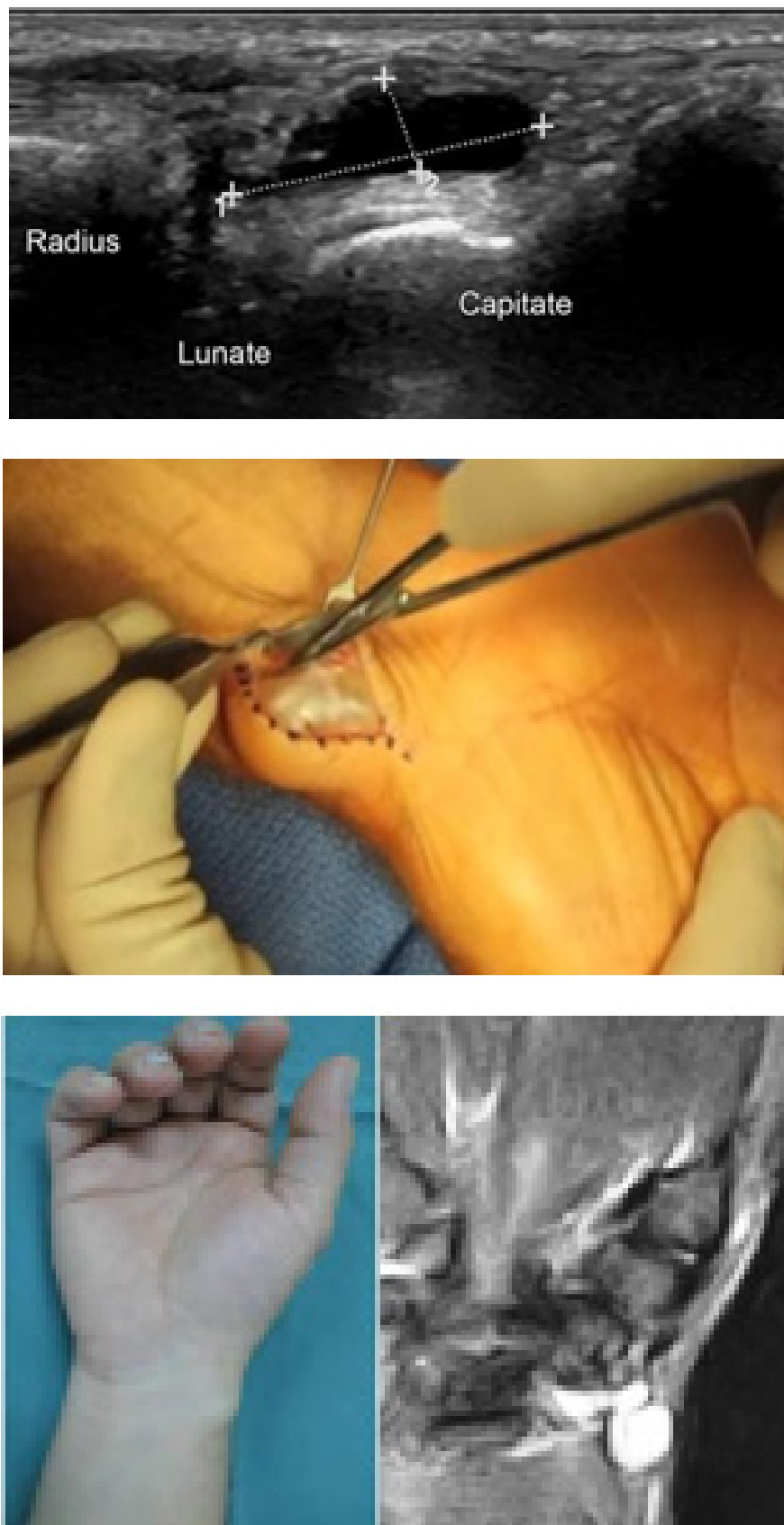


Fig. 1a: Ultrasound of ganglion cyst. **b:** Ultrasound of ganglion cyst. **c:** MRI of ganglion cyst.



Fig. 2a: Landing and marking over the ganglion cyst with opening volar ganglion cyst. **b:** Dissect of ganglion cyst. **c:** Visual field during and after excision.

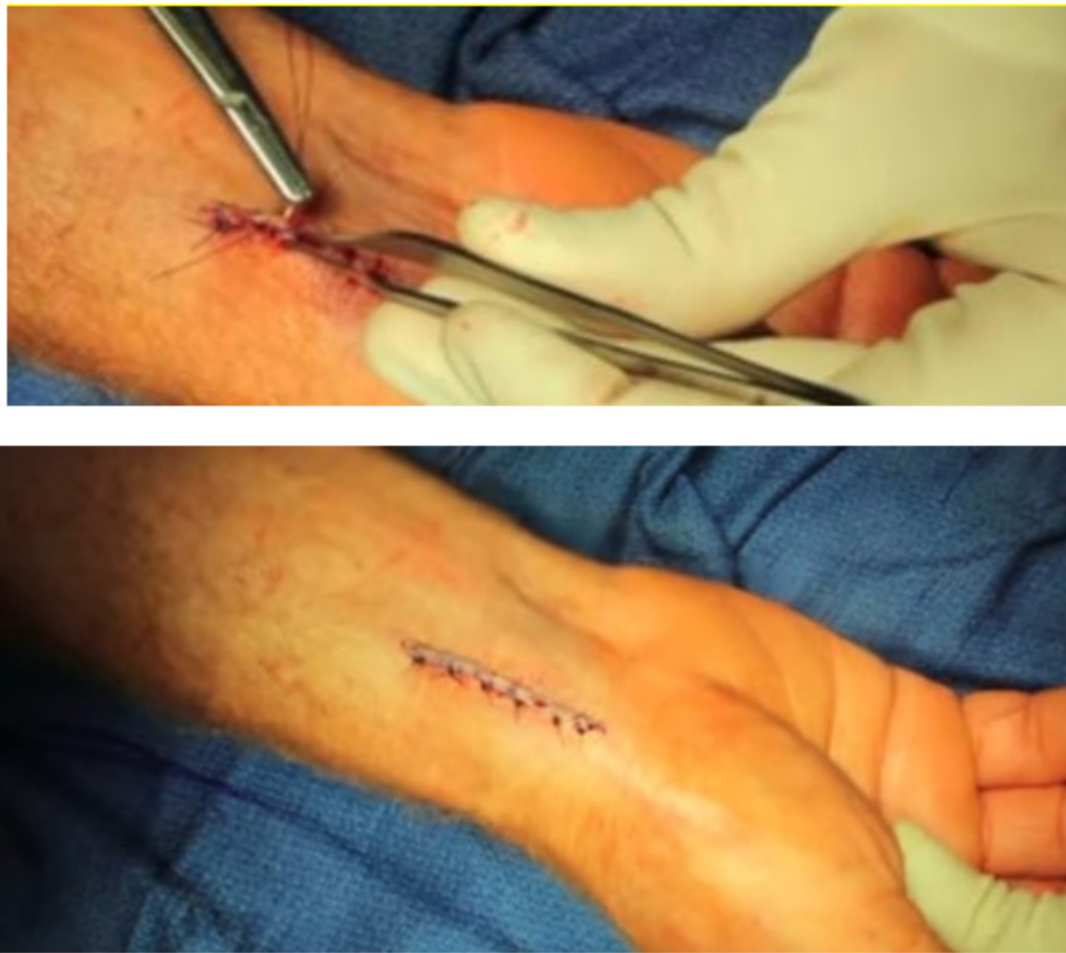


Fig. 3a: Repair by interrupted suture of the skin. **b:** Complete closure of the skin.

Ethical approval

The title, target, and plan of the research were discussed in and approved regarding ethics of research from Surgical Department, Alqureen Hospital, Sharkia, Egypt full written, informed consent was obtained from all patient.

Statistical analysis

The statistical program SPSS (SPSS Inc., 233 South Wacker Drive, 11th Floor, Chicago, IL 60606-6412). For windows, version 13 was used for data entry and analysis. Quantitative data were presented by mean and SD, while qualitative data were presented by frequency allocation. The χ^2 -test was used to contrast between two or more suitability. The student t-test was used to contrast two ways. The lowest agree level of significance was 0.05 or less.

RESULTS:

This research was done in Surgery Department, Alqureen General Hospital, Sharkia, Egypt during a period between January 2023 until December 2023 on 40 patients.

The research contained 12 (60%) female patients and eight (40%) male patients in group A and 14 (70%) female patients and six (30%) male patients in group B, and this difference was not statistically significant ($P=0.5$). The age of the patients extended between 15 and 30 years (mean age 23.6 ± 5.3). The two groups were comparable according to age and sex as an outcome to the favorable operation.

□Table 1 illustrates that the typical surgical excision required a substantially longer operation time (61.2 vs. 23.7 min; $P<0.001$) than the lay-open approach.

□Table 2 display that there was a significant variation between the two groups with regard to the operative maneuver difficulty ($P<0.001$). Radial artery injury happened in two (10%) patients in group A as versus one (5%) patient in group B, cut tendon happened in one (5%) patient in group A, while no patients in group B expert cut tendon. These variations were not statistically important. With regarding to intraoperative bleeding, there were two patients in group A who complained of intraoperative bleeding as versus none in group B, but this difference was not statistically important.

□Table 3 shows that group A had considerably more postoperative problems (neuropraxia, moderate to severe pain, analgesic use, scarring, length of incision, and recurrence). On the other hand, $P=0.3$ indicates that the differences between the two groups did not significantly affect the incidence of minor postoperative discomfort or wound infection.

In group B, □Table 4 displays that return to everyday work was faster (18.1 vs. 4.9 days; $P<0.001$). Patients in group B reported much greater levels of satisfaction (90% vs. 45%; $P<0.001$).

Table 1: Comparison among traditional surgical excision and lay-open maneuver with regarding to the time of operation

Operative	Group A (n=20)	Group B (n=20)	P value
Time (min)			
Range (Mean±SD)	45–90 (61.2±14.4)	15–30 (23.7±5.8)	<0.001*

*Statistically significant.

Table 2: Intraoperative difficulties

	Group A (n=20) [n (%)]	Group B (n=20) [n (%)]	P value
Intraoperative complications			
Operative maneuver difficulty	15 (75)	2 (10)	<0.001*
Radial artery injury	2 (10)	1 (5)	0.3
Median nerve injury	1 (5)	0	0.2
Cut tendon	1 (5)	0	0.2
Intraoperative bleeding	2 (10)	0	0.07

*Statistically important.

Table 3: Comparison among two kinds with regarding to the postoperative difficulties

Postoperative	Group A (n=20) [n (%)]	Group B (n=20) [n (%)]	P value
Complications			
Wound infection	2 (10)	1 (5)	0.3
Neuropraxia	5 (25)	0	<0.001*
Pain			
Moderate to severe	17 (85)	0	<0.001*
Mild	3 (15)	2 (10)	0.3
Analgesia			
Up to opioid analgesia	14 (70)	0	<0.001*
NSAIDS	6 (30)	20 (100)	<0.001*
Scarring	11 (55)	1 (5)	<0.001*
Surgical incision length (cm)	5–10 (7.7±1.9)	2–4 (3.4±0.8)	<0.001*
Recurrence	3 (15)	0	0.04*

*Statistically important.

Table 4: Recovery and patient satisfaction after operation

	Group A (n=20) [n (%)]	Group B (n=20) [n (%)]	P value
Recovery (return to normal activities) days	14–30 (18.1±4.9)	3–7 (4.9±1.5)	<0.001
Patient satisfaction	9 (45)	18 (90)	<0.001

DISCUSSION

Under local or general anesthesia, ganglion cysts can be surgically excised. The only effective therapy for ganglion cysts is surgical removal, which has the highest risk due to the possibility of nerve or blood vessel damage, particularly in the high-risk areas, scarring, and pain. However, serious surgical side effects are uncommon^[12]. Recurrence is the most common consequence, occurring in up to 40% of patients, according to evaluations^[15].

Difficult operative maneuver was experienced in 75% of patients and radial artery injury occurred in two (10%) patients, cut tendon occurred in one (5%) patient in group A (Table 2). These figures approximate those found by Aydin *et al.*^[16] who evaluated the surgery-related matters about the excision of volar wrist ganglia. It was found that injury to the median palmar cutaneous nerve happened in four (10%) patients and injury to the radial artery happened in two (5%) patients. The ganglia were linked to the radial artery in 26 (65%) patients, and thus the operative maneuver was hard.

It was found that recurrence rate of ganglion happened in 15% of patients who tolerate traditional surgical excision (Table 3). Comparable finding was notifying by Berghoff and Amadio^[17] and it was finished that ganglion surgery need a formal operative according to operation environment and careful maneuver to decrease injury to the near structures and to decrease the ratio of recurrence rate.

According to this study, patients in group B reported considerably greater levels of satisfaction (90 vs. 45%; $P < 0.001$) (Table 4). This feedback was consistent with two big studies that looked at the treatments for dorsal and volar wrist ganglia separately for a period of 5 and 6 years, respectively, and found that the group who had surgical interference had greater patient satisfaction^[14,15]. There have been suggestions that the longer duration of interference and the faster resolution might be related to the higher degree of pleasure associated with surgery^[18]. To draw attention to how important it is that patients understand all of their treatment options, the potential value of patient information booklets in providing comfort, and the relative risks and benefits including the likelihood of recurrence associated with each option.

Intensity of the study

The resultant scarring after traditional surgical excision and the invasive nature of the treatment modality appearing to be the only barrier to be recommended to every patient. However, the results

of lay-open maneuver were very encouraging to be applied to every patient with ganglion.

Restriction of the research

Lay-open maneuver is a fine new maneuver, thus, the comparison among our findings and other researches findings was difficult.

Many patients refused lay-open maneuver as they keep their mind that the ganglion should be completely excised. Thus, they seek for traditional surgical excision.

Some patients refused surgery and preferred aspiration

CONCLUSION

In clinical practice, wrist and hand ganglions are a highly common condition. Treatment outcomes vary, but according to recent study, lay-open surgery appears to be a better option for treating hand and wrist ganglions than standard surgical excision.

CONFLICT OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Burke FD, Melikyan EY, Bradley MJ, Dias JJ. Primary care referral protocol for wrist ganglia. *Postgrad Med J* 2003; 79:329–331.
2. Thornburg LE. Ganglions of the hand and wrist. *J Am Acad Orthop Surg* 1999; 7:231–238.
3. Lowden CM, Attiah M, Garvin G, Macdermid JC, Osman S, Faber KJ. The prevalence of wrist ganglia in an asymptomatic population: magnetic resonance evaluation. *J Hand Surg Am* 2005; 30:302–306.
4. Minotti P, Taras JS. Ganglion cysts of the wrist. *J Am Soc Surg Hand* 2002; 2:102–107.
5. Calif E, Stahl S, Stahl S. Simple wrist ganglia in children: a follow-up study. *J Pediatr Orthop* 2005; 14:448–450.
6. Coffey MJ, Fazlur Rahman M, Thirkannad SM. Pediatric ganglion cysts of the hand and wrist: an epidemiologic analysis. *Hand (NY)* 2008; 3:359–362.

7. Angelides AC, Wallace PF. The dorsal ganglion of the wrist: its pathogenesis, gross and microscopic anatomy, and surgical treatment. *J Hand Surg Am* 1976; 1:228–235.
8. Athanasian EA. Greens operative hand surgery. In: DP Green, RN Hotchkiss, WC Pederson, SW Wolfe, editors. *Greens operative hand surgery*. 5th ed. 2005; 2211–2265.
9. Westbrook AP, Stephen AB, Oni J, Davis TR. Ganglia: the patient's perception. *J Hand Surg Br* 2000; 25:566–567.
10. Osterwalder JJ, Widrig R, Stober R, Gächter A. Diagnostic validity of ultrasound in patients with persistent wrist pain and suspected occult ganglion. *J Hand Surg Am* 1997; 22:1034–1040.
11. Goldsmith S, Yang SS. Magnetic resonance imaging in the diagnosis of occult dorsal wrist ganglions. *J Hand Surg Eur Vol* 2008; 33:595–599.
12. Kang L, Akelman E, Weiss AP. Arthroscopic versus open dorsal ganglion excision: a prospective, randomized comparison of rates of recurrence and of residual pain. *J Hand Surg Am* 2008; 33:471–475.
13. Rocchi L, Canal A, Fanafi F, Catalano F. Articular ganglia of the volar aspect of the wrist, arthroscopic resection compared with open excision. A prospective randomised study. *Scand J Plast Reconstr Surg Hand Surg* 2008; 42:253–259.
14. Dias J, Buch K. Palmar wrist ganglion: does intervention improve outcome? A prospective study of the natural history and patient-reported treatment outcomes. *J Hand Surg Br* 2003; 28:172–176.
15. Dias JJ, Dhukaram V, Kumar P. The natural history of untreated dorsal wrist ganglia and patient reported outcome 6 years after intervention. *J Hand Surg Eur Vol* 2007; 32:502–508.
16. Aydin A, Kabakaş F, Erer M, Ozkan T, Tunçer S. Surgical treatment of volar wrist ganglia. *Acta Orthop Traumatol Turc* 2003; 37:309–312.
17. Berghoff RA Jr, Armadio PC. Dorsal wrist ganglion. Cause of dorsal wrist pain. *Orthopade* 1993; 22:30–35.
18. ASERNIP-S, Clinical treatments for wrist ganglia. Australia: The Royal Australasian College of Surgeons, 2008. Report No: 63