

Surgical Management of Pisiform Bone Deformity Associated with Tendonitis of Flexor Carpi Ulnaris

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Purpose: This study was performed to investigate the degree of symptom improvement after removal of bone fragment in patients with deformed pisiform bone associated with tendonitis of flexor carpi ulnaris.

Methods: Pisiform bone fragment removal was performed in 12 patients who had failed conservative treatment from January 2008 to December 2011. They were followed up at 2 weeks, 1 month, 2 months, 6 months, and 12 months after surgery. Their symptoms were assessed with Green score.

Results: Eleven of 12 patients who underwent bone fragment removal showed symptom improvement. Symptoms worsened in 1 patient due to pain and restricted range of motion caused by postoperative scar.

Conclusion: The results of this study suggest that removal of bone fragment may be an effective treatment in patients with tendonitis of flexor carpi ulnaris accompanied by pisiform bone deformity whose pain does not improve with conservative management.

Keywords: Flexor carpi ulnaris, Pisiform bone, Surgical management, Wrist pain, Bone widening

INTRODUCTION

Wrist pain is the most commonly reported complaint during everyday activity, and a wide range of factors may cause the wrist pain¹. A precise assessment of the cause of wrist pain, as well as an accurate diagnosis, is essential in appropriate management of wrist pain. One cause of wrist pain includes pain around the pisiform bone due to tendonitis of flexor carpi ulnaris, mostly caused by overuse of muscle or bone fracture²⁻⁵. A carpal tunnel X-ray view of the patients complaining of pain at the pisiform bone shows bone widening and calcification (Fig. 1), similar to that seen in bone widening of the calcaneus

in Haglund deformity⁶.

Haglund deformity is a disease caused by bone widening at the posterior site of the heel; the widening causes friction at the soft tissue surrounding the Achille's tendon, resulting in aggravation and inflammation⁷⁻¹⁰. Similarly, patients with wrist pain who show calcification of the pisiform bone— we said pisiform deformity— on X-ray and who reports either direct tenderness or pain upon wrist flexion or ulnar deviation may be considered to have pathophysiology equivalent to Haglund deformity. Therefore, it is plausible to consider the removal of the widened bone—the protruded or calcified site of the pisiform bone—as a treatment reducing the pain^{11,16}. This



Fig. 1. Bone widening of the pisiform bone in carpal tunnel X-ray view of the patient with tendonitis of flexor carpi ulnaris caused by repeated movement and inflammation.

study aims to discuss the results of this method and the surgical technique involved.

MATERIALS AND METHODS

1. Study population

The study was performed from January 2008 to December 2011 and included 7 male and 5 female subjects. The mean age of the subjects was 47 years, and the duration of disease was 8 years. The mean duration of conservative treatment including the use of non-steroidal anti-inflammatory drug (NSAID), physical therapy, or steroid injection was 4.8 months. 2 persons injection steroid who diagnosed tenosynovitis. They were injected 2 or 3 times. The mean follow-up duration was 14 months. Patients with trauma or systemic musculoskeletal disease were excluded. 9 of the 12 patients received their first diagnosis

in local hospitals—4 were diagnosed with fracture, 2 with tenosynovitis, 2 with tumor, 1 with normal finding and 2 with non diagnosis (Table 1). Symptoms included tenderness in 12 patients, pain upon wrist flexion in 8 patients, pain upon wrist extension in 9 patients, and pain upon ulnar deviation in 6 patients (Table 2).

2. Diagnosis

The clinical signs were checked and diagnostic workups performed in order to diagnose the disease. The diagnostic tests included simple anteroposterior and lateral radiograph of the wrist, carpal tunnel view, and ultrasonography aiming to confirm the hypertrophy of the bone (Fig. 2)¹²⁻¹⁵. Modified scoring system of Green and O'Brien was used as functional assessment tool—the mean preoperative pain score of the patients was 65, with 8 evaluated as fair and 4 evaluated as poor.

3. Diagnosis

Surgery was performed in patients whose symptoms did not improve after a minimum of 1 month of conservative treatment. The patients were put under general anesthesia, and appropriate preoperative treatment was performed on the upper extremities. A V-shaped skin incision of 3 to 5 cm was made around the pisiform bone at the ulnar site of the palm. The soft tissue and the fascia were dissected, and the flexor carpi ulnaris was located, which was retracted towards the radial direction in order to expose the pisiform bone. The hypertrophy of the pisiform bone was grossly confirmed, and the resection site was planned. The hypertrophied site was removed using bone forcep and osteotome, and the roughened surface of the resection site was smoothed. The operative site was irrigated with normal saline, and antiadhesive agent

Table 1. Primary diagnosis in local hospital

Diagnosis	Fracture	Tenosynovitis	Tumor	Normal
n	4	2	2	1

Table 2. Symptoms and signs

Symptoms	Direct tenderness	Wrist flexion pain	Wrist extension pain	Ulnar deviation painNormal
n	12	8	9	6



Fig. 2. Radiograph and ultrasonograph of the patient with tendonitis of flexor carpi ulnaris. **(A)** Bone widening of the pisiform bone can be observed on radiograph. **(B)** Ultrasonograph also shows calcified tissues between the pisiform bone and flexor carpi ulnaris (FCU).

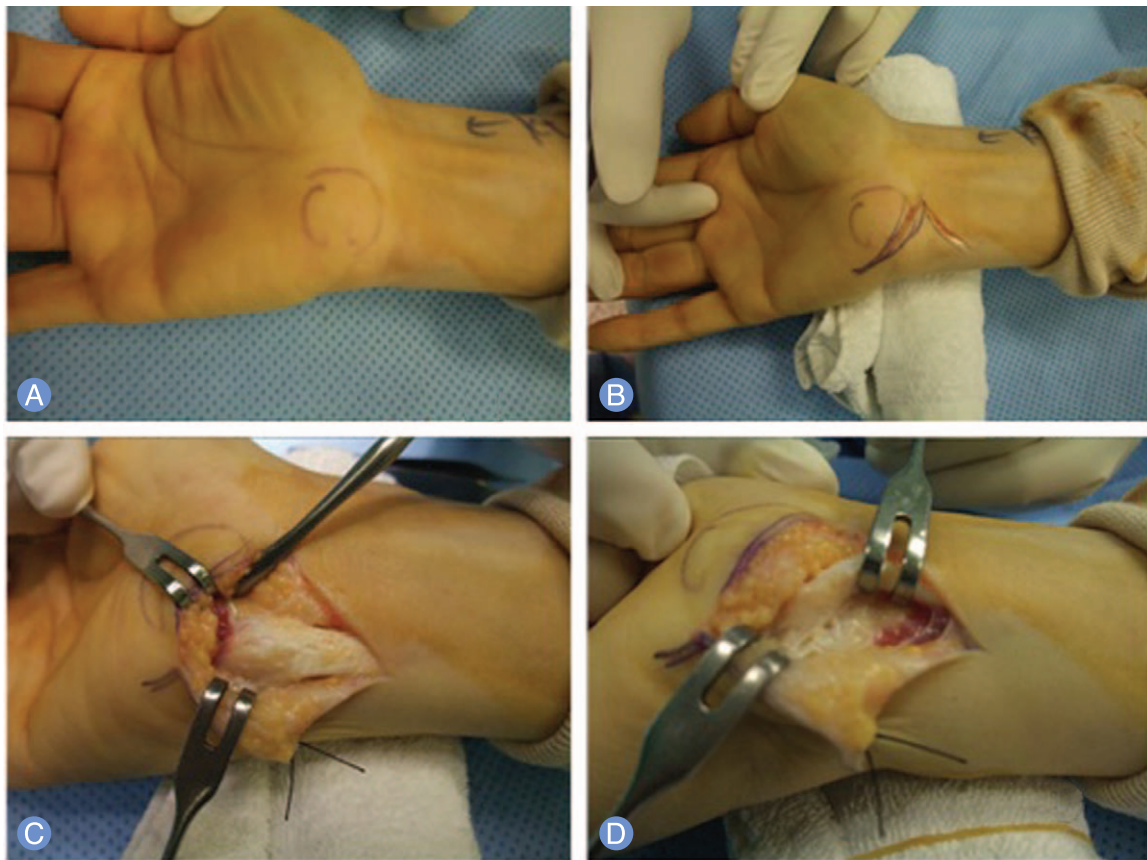


Fig. 3. Surgical technique on bone widening due to inflammation of the flexor carpi ulnaris. **(A)** The pisiform bone at the ulnar side of the palm was checked through palpation. **(B)** A V-shaped skin incision was made at the ulnar side to confirm the location of the pisiform bone. **(C)** The skin was retracted to obtain operative window, and the flexor carpi ulnaris was found after dissection of the soft tissue and the fascia. **(D)** The flexor carpi ulnaris was retract towards the radial side to expose the pisiform bone.

preventing adhesion of the tendons was applied, followed by aseptic disinfection techniques. The sutures were removed at 14 days after operation, and the mean

operative time was 20 minutes. Joint movement of the wrist was immediately begun after the operation (Figs. 3, 4)^{6,12}.

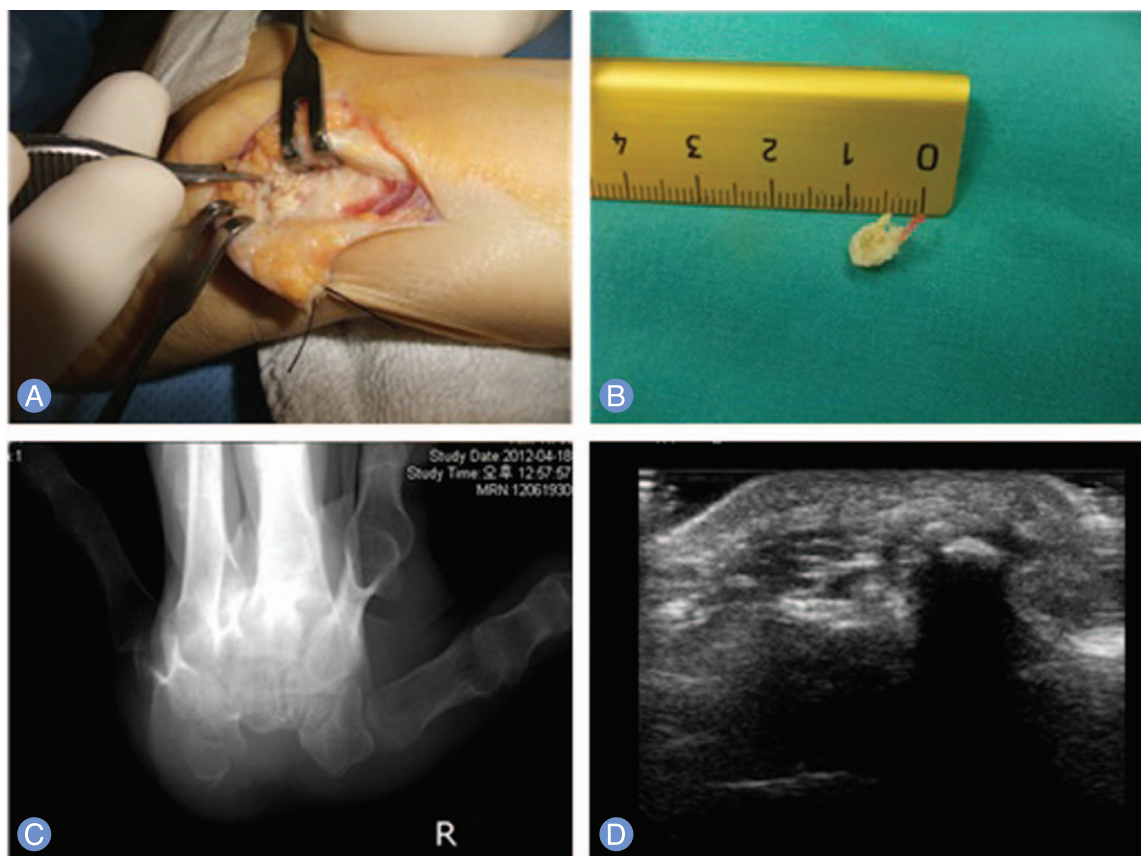


Fig. 4. Surgical technique on bone widening due to inflammation of the flexor carpi ulnaris. **(A)** The hypertrophied portion of the pisiform bone found after radial retraction of the flexor carpi ulnaris is marked and is resected. **(B)** Bone fragment after removal. **(C)** Carpal tunnel X-ray after bone fragment removal. **(D)** Bone fragments observed preoperative are not present.

Table 3. Postoperative Green score

Green score	Excellent	Good	Fair	Poor
n=12	8	3	0	1

4. Clinical and radiologic evaluation

Joint movement was begun immediately after operation, including wrist flexion and wrist extension. The exercise gradually started to include muscle strengthening exercise using dumbbells. The patients' wrist pain, range of motion of the joints, muscle strength, and function was evaluated at 2 weeks, 1 month, 2 months, 6 months, and 12 months after surgery quantified with Green score. Radiographic evaluation involved analysis of the simple radiograph performed at the last follow-up period, confirming the calcification or hypertrophy surrounding the pisiform bone. Ultrasonography was also performed to

check the removal of the calcified tissue located between the flexor carpi ulnaris and the radial bone.

RESULTS

The effect of the surgery was assessed using postoperative radiograph and ultrasonograph^{17,18}. There was not recurrence of the pisiform deformity after the operation. The follow-up of 12 patients who underwent surgery found the mean Green score to be 82.4 points, with 8 patients evaluated as excellent, 3 as good, and 1 as poor (Table 3). 1 of the 12 patients were evaluated as poor,

which was due to pain and reduced range of motion at the wrist caused by postoperative scar at the surgical site; however, the patient reported decreased pain 6 months later.

DISCUSSION

Among the various causes of wrist pain, tendonitis of the flexor carpi ulnaris results from overuse or fracture of the wrist. The primary treatment of choice for this disease is conservative management including administration of NSAIDs, physical therapy, and intraarticular injection of steroid¹⁹. However, such pain management may not easily improve symptoms if bone widening is accompanied with the tendonitis. Therefore, the removal of the hypertrophied portion of the bone (caused by the tendonitis) that narrows the passage of the ligaments, resulting in pain, has been considered in order to relieve the symptoms. As a result, 11 of the 12 patients whose symptoms did not improve with conservative management reported pain relief. This result suggests that surgical management is an effective treatment in tendonitis of flexor carpi ulnaris with deformity of the pisiform bone in case conservative treatment alone does not result in improvement¹¹. However, this study has several limitations, including a small sample size of 12 cases, short follow-up period, and the inability to adjust for various factors that affect postoperative joint movement, pain, and muscle strength.

CONCLUSION

While not common, the deformity of the pisiform bone due to tendonitis of flexor carpi ulnaris is one of the causes of wrist pain. We have investigated the surgical management of this disease and the effect of treatment. Since 11 of the 12 patients who underwent surgery reported symptom improvements, resection of the bony protrusion at the pisiform bone should be considered as a viable option in patient group in which conservative management is ineffective.

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척측 수근굴근의 건염과 동반된 두상골 변형에 대한 수술적 치료

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목적: 위 연구는 대중적 치료로 통증 호전을 보이지 못한 두상골 변형을 동반한 척측 수근굴근건염 환자에게서 골편제거술을 시행하였을 경우 증상 호전의 정도를 확인하기 위해 진행하였다.

방법: 2008년 1월부터 2011년 12월 중에 1달 이상 보존적 치료를 시행하였으나, 증상이 호전되지 않는 12명의 환자를 대상으로 골편제거술을 시행하고, 2주, 1개월, 2개월, 6개월 1년후 추시하여 증상 호전으로 Green score로 기록하였다.

결과: 12명의 환자들에게서 수술을 시행한 후, 11명의 환자에서 증상 호전 양상을 보였으며, 1명의 환자에게는 증상이 악화되었는데, 이는 수술 후 발생한 흉터로 인한 관절 운동의 제한 및 통증이 원인이었다.

결론: 본 연구로 미루어 볼 때, 보존적 치료로 증상 호전이 되지 않는 두상골 변형을 동반한 척측 수근굴근건염 환자에게서 골편제거술은 효과적인 치료법으로 고려할 수 있다.

색인단어: 척측 수근굴근염, 두상골, 수술적 치료, 손목부위 통증, 골확장증

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