

## Treatment of Kienbock's Disease by an Experimental Conservative Approach: Case report

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### Abstract

Kienböck's disease is characterized by avascular necrosis of the lunate bone. There are four stages due to the severity of the disease. A 52-year-old woman was referred to the Tehran Healthcare Clinic to treat the stage II Kienböck's disease according to the clinical finding and MRI report. Her main complaint was a painful feeling in the dorsal wrist, decreased range of motion of the wrist, and reduced grip strength for one year. The treatment was achieved after completion of our conservative course by special vibration therapy in less than two months. Even though the conservative approaches are generally not recommended in treatment of Kienböck's disease and in many cases surgeon's preference (radial shortening osteotomy for early disease and PRC in later stages), our theory is that the aggressive procedure should be the second choice of treatment, especially in the early stages (I and II).

**Keywords:** Kienböck's Disease, Conservative Method, Avascular Necrosis, Lunate Bone

### Background

Kienböck's disease is classified as an uncommon wrist disorder distinguished by developing avascular osteonecrosis of the lunate carpal bone and usually affects one hand and one bone (the lunate) [1]. Although Robert Kienböck, an Austrian radiologist, described it for the first time in 1910, the etiology of the disease is still undetermined and controversial [2]. Selecting the appropriate treatment depends on the stage of the disease. While Schmitt's vascularization Magnetic resonance imaging (MRI) evaluation [3] and Bain's cartilage arthroscopic assessment are dominant in properly staging Kienböck's disease [4], Lichtman's radiographic staging system remains a commonly used classification for the disease [5].

In stage I, diffusely decreased signals are recognized on T1 and T2-weighted images and treated without surgery [6]. In the second stage, sclerosis of the lunate bone, compression, and early collapse in the radial border with or without fracture lines may emerge. In stage IIIA, significant lunate collapse appears in radiography because of the loss of its blood supply, but the rest of the carpus is not involved yet [6]. So, for treatment of stage II or IIIA, radial shortening osteotomy or radial-wedge osteotomy is recommended before the lunate's advanced collapse [6].

In stage IIIB, palmar rotation of the scaphoid happens, and the capitate bone is proximally migrated [6]. Consequently, treatment focuses on fixing the collapse of the wrist bones, including

correcting scaphoid hyperflexion and scaphotrapeziotrapezoid. Proximal row carpectomy (PRC) is the most commonly performed in this stage [6].

General degenerative changes in the midcarpal joint and/or radiocarpal joint (carpus) are associated with stage IV [6]. In this stage, treatment is limited to wrist arthrodesis and PRC [6]. There are different ways to treat Kienböck's disease, ranging from conservative methods to surgical procedures, and this can make it hard to decide which treatment is the best.

This case report presents the complete treatment of stage II Kienböck's disease by an experimental conventional method in less than two months. The patient provided his informed consent for the publication of the case details.

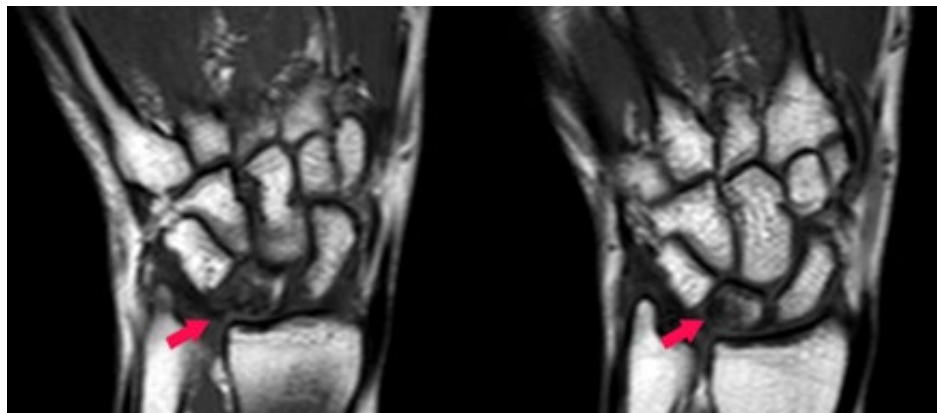
### Case Presentation

A 52-year-old Iranian woman was referred to the Tehran Healthcare Clinic to treat Kienböck's disease involving her dominant right wrist. Her main complaint was a painful feeling in the dorsal wrist, decreased range of motion (ROM) of the wrist, and reduced grip strength for one year. There was no visible sign of traumatic events in the past.

The patient felt pain and reduced ROM 18 months ago. Then, she was admitted to five different orthopedic centers, all of which suggested surgery, but the patient refused. Finally, one center recommended physiotherapy for three months. According to her,

the treatment failed, and the symptoms were nearly the same as those of the admission. The patient had received painkillers to reduce the pain before being referred to the Tehran Healthcare Clinic.

Our clinical examination indicated dorsal tenderness and swelling. The active range of wrist motion, including flexion and extension, was significantly limited. MR images revealed Stage II disease by reporting sclerosis in the bone marrow, low signal intensity on T1-weighted images, and variable on T2-weighted images (Figure 1).



**Figure 1:** 52-year-old woman due to stage II Kienböck disease.

The patient was aware of our routine conservative methods in the clinic. Pain relief, motion preservation, and conservation of strength and function are the goals of treatment. According to the clinical and MRI findings and reports, we administered our conservative treatment by special vibration therapy (SVT) one day per week and throughout 6 to 8 weeks, depending on her response to therapy. In our clinic, SVT is performed along with a hand therapist to direct the movements into the damaged wrist and improve blood flow through stimulation. The patient was satisfied with the course in the first couple of courses. The pain was reduced significantly, and grip strength improved so she could close and touch her fingers, unlike the first day when she could not hold a pen. After the completion of the course, the clinical symptoms were entirely removed, the active motion has returned to normal range, and the follow-up will be continued.

### Discussion

The exact etiology of Kienböck's disease is not understood clearly. Even though the prevalence of the disease is about 7 per 100000 [7], asymptomatic cases are reported frequently [8]. These data established that patients who suffer from Kienböck's disease are rare.

Various treatment options are available depending on the severity of the disease and, in many cases, the surgeon's preference [9]. Conservative approaches are generally not recommended except in very early cases or children [9]

Radial shortening osteotomy is the most common treatment for improving wrist mobility and grip strength in stages I to IIIA of Kienböck's disease [10]. The outcomes of a European survey of orthopedic surgeons in the United Kingdom, Germany, and France on treatment options for Kienböck disease revealed that the first choice of therapy in the early stage was radial shortening osteotomy in the UK (68%), France (49%), and Germany (69%) [11].

In this study, the experimental conservative approach was successful in treating stage II in less than two months. We hypothesize that some conservative methods like ours improve blood flow to the damaged elements by stimulation. Consequently, the self-healing phenomenon of the body happened, which is very impressive. Another study also demonstrated that 74% of surgeons would examine conservative management first [10]. So, the aggressive procedure should be the second choice of treatment, especially in the early stages (I and II).

As this was the only patient who suffered from Kienböck disease and was referred to our clinic, more patients are needed to investigate. As we achieve the same result in other cases, this method could be introduced as an effective conservative method for treating Kienböck disease.

### Declarations

#### Funding

There is no funding for this research.

#### Conflicts of Interest

The author(s) declare no competing interests.

#### Data Availability

All data generated or analyzed during this study are included in this published article.

#### Ethics Approval

The patient provided his informed consent for the publication of the case details.

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