Late Reconstruction of a Traumatic Trapeziometacarpal Dislocation with a Semi-constrained Prosthesis: A Case Report

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Abstract
Traumatic dislocation of the trapeziometacarpal joint is rare. A stable reduction should be accomplished as soon as possible, usually with K-wiring. In this case of persistent instability a semi-constrained prosthesis was applied successfully.

Key Words
Endoprosthetics · Hand · Hand surgery · Orthopedic trauma · Sudeck

Introduction
Traumatic dislocation of the trapeziometacarpal (TM) or first carpometacarpal (CMC) joint is rare. Therapy consists of a stable reduction, either by closed or open reduction and with or without instrumentation. In this case of recurrent dislocation a joint prosthesis was used.

Case Report
A 58-year-old woman sustained a fall from the stairs and complained of a painful right hand. Prior to this trauma she had no complaints of this hand. Four days after this injury she visited the emergency department: a traumatic dislocation of the first carpometacarpal joint was diagnosed. After closed reduction a plaster of Paris cast was applied. Due to pain and swelling the plaster had to be removed after 17 days. There was pressure ulceration. Despite further treatment with a cast the pain did not decrease and a redislocation was diagnosed by X-ray (Figure 1).

The patient was then referred to the orthopedic outpatient clinic. She was in pain because of this hand and the function of her dominant right hand was diminished. There was tenderness and an ulceration at the base of the first metacarpal with instability. First web opening measured 50°. Pinch grip was almost not possible and for this reason very weak. A reconstruction with a joint prosthesis was suggested and informed consent obtained.

Pre-operative visual analogue scale (VAS) scores were taken for pain (which measured 8), daily activities (ADL; which measured 1.5) and satisfaction (which measured 2) [1].

Two days prior to surgery oral vitamin C prophylaxis (500 mg daily for 50 days) was started, to diminish the chance for occurrence of complex regional pain syndrome (CRPS) type I, as described in a trauma protocol for wrist fractures [2].

After healing of the ulceration, the operation was performed as a day case under plexus anaesthesia. A cementless total trapezio-metacarpal joint prosthesis (Roseland prosthesis; Depuy International Ltd, Leeds, England) was implanted [3]. This prosthesis of titanium alloy has a partial hydroxyapatite coating and is semi-constrained. Postoperative treatment consisted of a plaster of Paris for 6 weeks. Follow-up was after 2 weeks, 6 weeks, 8 weeks, 3 months, 6 months and 12 months with X-ray (Figure 2) and yearly afterwards. Physiotherapy was started 2 weeks after removal of the plaster. Six weeks later there was a stable situation, an excellent function and high satisfaction rate, which persisted during the 4 years of follow-up: first web opening 90°, VAS for pain, ADL and satisfaction were respectively 0, 10 and 10. There were no signs of CRPS type I, nor did any other complication occur in the 4 years that have passed now since the implantation.
Discussion

A sole dislocation of the carpometacarpal joint of the thumb is not a very common injury. Diagnosis can initially be missed [4, 5]. The mechanism is a longitudinally applied force when the base of the thumb is in slight flexion. In this situation the base of the thumb will dislocate in a dorsoradial direction. Spontaneous subluxation due to osteo-arthritis is seen in Dell stage III [6]. The dorsoradial ligament is supposed to be the primary restraining force with respect to the acute dorsal dislocation of the thumb [7].

Treatment consists of closed reduction, fixation with percutaneously placed K-wires and a plaster of Paris. The best results will be achieved when patients are treated immediately after the trauma, preferably the same day [8]. Because of unstable results, others also advocate ligamentous reconstruction to prevent recurrent instability [5, 9]. Surgery of the trapezio-metacarpal joint is known to be demanding and complication rate is high [5]. Takwale et al. report of CRPS in 19% of their cases [5]. If arthritis is present an arthroplasty or arthrodesis can be performed [10, 11].

As this patient had no complaints at all, before her fall, the goal was to restore full function. For this reason the joint replacement was chosen. If the procedure or the prosthesis would fail, there would be two options left as a salvage, namely a tendon interposition arthroplasty or a fusion (arthrodesis). A ligament reconstruction seemed not to be a real option because of the long interval between the trauma and the moment of surgery. So, in this case of late treatment of a recurrent dislocation a semi-constrained prosthesis was implanted successfully. The clinical and radiological results after four years follow-up are excellent.

Conclusion

Recognition of a traumatic trapezio-metacarpal dislocation is mandatory for correct treatment of this problem. In case of a recurrent or persistent instability the choice of treatment is usually an arthroplasty or arthrodesis. In this particular case an implantation of a prosthesis led to a stable situation. The described semi-constrained device leads to a good clinical result, during midterm follow-up. Long-term follow-up is not yet available.

References


Figure 1. Traumatic dislocation of trapeziometacarpal joint of the right hand.

Figure 2. Stable implantation of the semi-constrained hydroxyapatite coated trapeziometacarpal prosthesis (type Roseland; Depuy Int. Ltd, Leeds, England).