BRIEF REPORT

Extensor Hood Syndrome—Osteophytic Irritation of Digital Extensor Tendons in Rock Climbers

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Objective.—Injuries to the flexor tendons and flexor tendon pulleys are frequently reported in rock climbers. Osteoarthritic changes with bone spurs are also well known. We report on the less commonly described extensor tendon irritation caused by such osteophytes.

Methods.—Thirteen high-level rock climbers (12 men, 1 woman; average age 33.8 years [range 17–55]; average years of climbing experience 19 [range 5–30]; average climbing level 10.2) with extensor hood irritation caused by dorsally located osteophytes of proximal interphalangeal ($n = 10$) or distal interphalangeal joints ($n = 3$) were evaluated and managed. Twelve climbers received conservative therapy and 1 climber was treated surgically.

Results.—Before treatment, the climbers were unable to achieve their normal climbing ability due to extensor tendon irritations with resultant effusion noted in the ultrasound examinations. After conservative treatment, and in 1 case surgery, all patients achieved their previous climbing ability.

Conclusion.—While all climbers were able to achieve their former climbing level after treatment, the condition is progressive and the osteoarthritic changes will likely cause further problems for these individuals in the future. Extensor hood irritation must be considered in the differential diagnosis of finger pain in rock climbers.

Key words: rock climbing, extensor tendon, osteophytes, sport climbing, finger pain

Introduction

Finger injuries are the most common injuries occurring in rock climbers.^{1–3} Most often the flexor tendons and their pulleys are affected.¹ In long-time climbers progressive osteoarthritic changes of the small finger joints have been observed.^{4–6} These changes can present as large bone spurs, on both the flexor and extensor sides of the digits.⁶ With intensive use of the crimp grip position during climbing (Figure 1), these bone spurs can produce irritation to the extensor tendons, an observation that has received little attention to date.⁶

Case Series

We treated 13 rock climbers in a 3-year period in our sportsorthopedic outpatient clinic (12 men, 1 woman;

average age 33.8 years [range 17–55]) (see Table) complaining of dorsal-sided pain of the proximal and/or the distal interphalangeal (PIP/DIP) joints. They had been climbing at a high intensity for an average of 19 years (range 5–30) with an average climbing level of 10.2 (metric) (10+ UIAA [Union Internationale des Associations d'Alpinisme], or 5.14a US; range 9.0–11.3 metric). Physical examination demonstrated an extension deficit of 3–5 degrees of the PIP joint in 7 climbers, while flexion was mildly restricted in 4 climbers (distance of finger tip to palm in full flexion 0–1 cm). The PIP joint was affected in 10, and the DIP joint in 3 climbers. Ultrasound examination showed fluid and effusion around the extensor tendon hood, similar to a halo phenomenon in palmar sided tenosynovitis of the flexor tendons. Ultrasound also showed a change in the course of the extensor tendons due to osteoarthritic dorsal bone spurs. Plain radiographs revealed dorsal bone spurs (osteophytes) on the PIP joint in all climbers and on the DIP joint in 3 climbers (Figure 2). According to the Kellgren-

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Figure 1. The crimp position.

Lawrence scale⁷ the radiographs (in 7 cases bilateral) revealed 5 grade 2, 12 grade 3, and 3 grade 4 osteoarthritis. Each of these dorsal bone spurs was causing irritation to the extensor hood, resulting in fluid accumulation and tenosynovitis-like conditions, given that the extensor tendons do not have true tendon sheaths compared to the flexor tendons at the level of the DIP and PIP joints. In 2 cases the dorsal osteophyte had already broken off.

In one young climber (20 years old, climbing level 11-/5.14b, climbing years 12, German Champion in Bouldering and Lead Climbing) the radiographs showed old epiphyseal fractures, which resulted in large bone spurs on both sides (Figure 3). These caused only mild irritation of the extensor hood and he has continued to perform at full level. Radiographs in this case were

Figure 2. Climber with 30 years of climbing with stage 4 osteoarthritis in the distal interphalangeal and proximal interphalangeal (PIP) joints and extensor hood irritation in the PIP joint.

performed in follow-up after prior epiphyseal fractures some years earlier, during the yearly national team exams. One other young climber (17 years old) also had symptoms following epiphyseal fracture 2 years prior.

All climbers initially received conservative therapy with stress reduction (avoiding crimping and limiting climbing to 2 levels under their highest ability), anti-inflammatory hand baths (eg, sulfur hand baths), ammoniumbituminosulfonate (20%) (Ichtholan®) ointment

Table. Description of climbers with extensor hood syndrome

Climber no.	Side	Finger	Joint	Age (y)	Climbing level	Climbing years	Kellgren-Lawrence score
1	Right	Middle	DIP	31	9.5	22	3
2	Right	Middle	PIP/DIP	44	10.3	30	4
3	Both	Middle	PIP	39	10.3	22	3 and 3
4	Both	Middle	PIP	42	10.3	21	3 and 4
5	Both	Middle	PIP	25	11.0	6	2 and 3
6	Both	Ring	PIP	37	11.3	17	2 and 2
7	Both	Middle	PIP	20	10.7	8	2 and 3
8	Right	Middle	DIP	33	10.0	23	3
9	Left	Ring	PIP	28	9.7	14	3
10	Right	Middle	DIP	43	10.3	18	3
11	Both	Middle	PIP	25	9.7	20	3 and 3
12	Both	Middle	PIP/DIP	55	9.0	30	3 and 4
13	Right	Ring	PIP	17	10.3	5	2

Climbing level metric. DIP = distal interphalangeal joint; PIP = proximal interphalangeal joint.

Figure 3. Extensor hood irritation after epiphyseal fracture. This 20-year-old athlete performs at full level and won the German Championships in both Bouldering and Lead Climbing.

therapy, and nonsteroidal anti-inflammatory drugs. In 5 cases additional peri-tendineal local corticosteroid injection was performed. In all 12 symptomatic cases the conservative therapy led to good results: the climbers were pain-free after 3 to 4 weeks and were able to compete and climb at their previous levels. Although the bone spurs persisted, the inflammatory condition around the extensor hood was diminished in follow-up ultrasounds. In 1 case irritation persisted, and, therefore, the osteophyte was removed surgically (**Figure 4**). After recovery the athlete was able to regain his former level of performance.

Discussion

Osteoarthritic conditions in long-time climbers are well known²⁻⁶ and several studies demonstrate that osteoarthritic changes in the hands of rock climbers increases with years of climbing.^{4,8} Epiphyseal fractures in young climbers can also lead to an early onset of osteoarthritis, especially if neglected and not treated correctly.⁹ In young and highly active sport climbers (junior national team) stress-related osseous reactions were reported,⁸ but a 5-year longitudinal study did not find that they lead to an early onset of osteoarthritis.⁵ It is surprising that

climbers with high-stage osteoarthritis in their fingers (Kellgren-Lawrence⁷ grade 3 and 4) often do not complain about a high level of pain and discomfort.⁶ Nevertheless they may have a remarkable decrease in range of motion and extensive radiographic findings.⁶ It is not surprising that these dorsal- and palmar-sided osteophytes will lead to irritations of the tendons. In general, only flexor tendon problems, such as pulley ruptures, tenosynovitis, or tendon ruptures,^{1-3,10} have been reported in rock climbers. This is the first time extensor tendon problems have been reported in the literature. It is surprising that the climbers only presented with complaints of discomfort in the region of the extensor hood and not with osteoarthritic problems, other than minor morning stiffness. The clinical findings of osteoarthritic problems in climbers may not correlate with radiographic findings. Hochholzer and Schöffl⁶ reported stage 4 osteoarthritic findings in rock climbers, which

Figure 4. The broken-off osteophyte at the PIP joint was surgically removed.

surprisingly lead to little discomfort. All but 1 climber recovered with conservative therapy alone. Rohrbough et al⁴ assessed radiographs of the hands in veteran climbers (n = 65, average climbing experience 19.8 years) versus nonclimbing controls and found the rate of osteoarthritis not significantly different; however, the climbers were more often affected in specific finger joints. Nevertheless, the osteoarthritic conditions in these patients with bone spurs and osteophytes will persist and further future problems are to be expected. Ultimately, surgical removal of the osteophytes may become necessary.

References

1. Schöffl V, Hochholzer T, Winkelmann H P, Strecker W. Pulley injuries in rock climbers. *Wilderness Environ Med.* 2003;14:94–100.
2. Schöffl VR, Schöffl I. Finger pain in rock climbers: reaching the right differential diagnosis and therapy. *J Sports Med Phys Fitness.* 2007;47:70–78.
3. Haas JC, Meyers MC. Rock climbing injuries. *Sports Med.* 1995;20:199–205.
4. Rohrbough JT, Mudge MK, Schilling RC, Jansen C. Radiographic osteoarthritis in the hands of rock climbers. *Am J Orthop.* 1998;27:734–738.
5. Schöffl VR, Hochholzer T, Imhoff AB, Schöffl I. Radiographic adaptations to the stress of high-level rock climbing in junior athletes: a 5-year longitudinal study of the German junior national team and a group of recreational climbers. *Am J Sports Med.* 2007;35:86–92.
6. Hochholzer T, Schöffl V. Degenerative Veränderungen der Fingergelenke bei Sportkletterern. [Osteoarthrosis in fingerjoints of rockclimbers]. *D Z Sportmed.* 2009;60:145–149.
7. Kellgren JH, Lawrence JS. Radiological assessment of osteo-arthritis. *Ann Rheum Dis.* 1957;16:494–502.
8. Schöffl V, Hochholzer T, Imhoff A. Radiographic changes in the hands and fingers of young, high-level climbers. *Am J Sports Med.* 2004;32:1688–1694.
9. Hochholzer T, Schöffl VR. Epiphyseal fractures of the finger middle joints in young sport climbers. *Wilderness Environ Med.* 2005;16:139–142.
10. Rooks MD, Johnston RB 3rd, Ensor CD, McIntosh B, James S. Injury patterns in recreational rock climbers. *Am J Sports Med.* 1995;23:683–685.