



DYNAMIC HINGED SPLINT FOLLOWING A SURGICAL REATTACHMENT OF A DISTAL TRICEPS TENDON AVULSION

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Purpose:

- The purpose of this case study is to present the use of a dynamic hinged splint in the treatment protocol following a surgical reattachment of a distal triceps tendon avulsion.

Background:

- Triceps avulsions are very uncommon injuries, occurring in less than 1% of upper extremity cases.
- Many of these avulsions take place at the distal insertion of the triceps.
- Current literature includes triceps rupture after a traumatic injury, surgical procedure, total elbow arthroplasty, and after spontaneous conditions (such as endocrine disorders, steroid use, renal failure, and chronic olecranon bursitis).
- Some of the traumatic injuries are associated with sports and labor activities.
- Two of the previously published articles that incorporated a dynamic elbow splint were reviewed and compared to analyze the different outcomes.

Method:

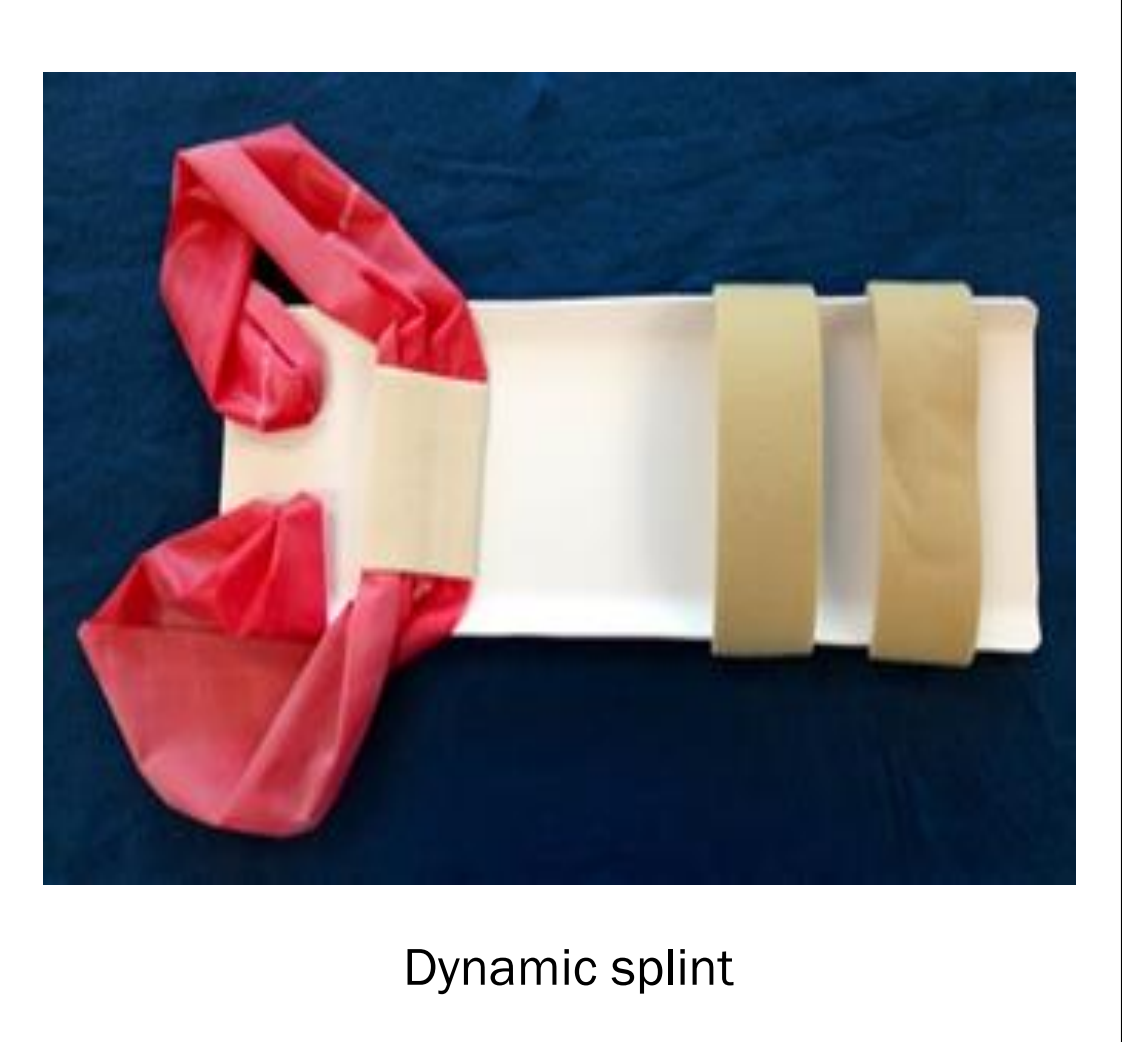
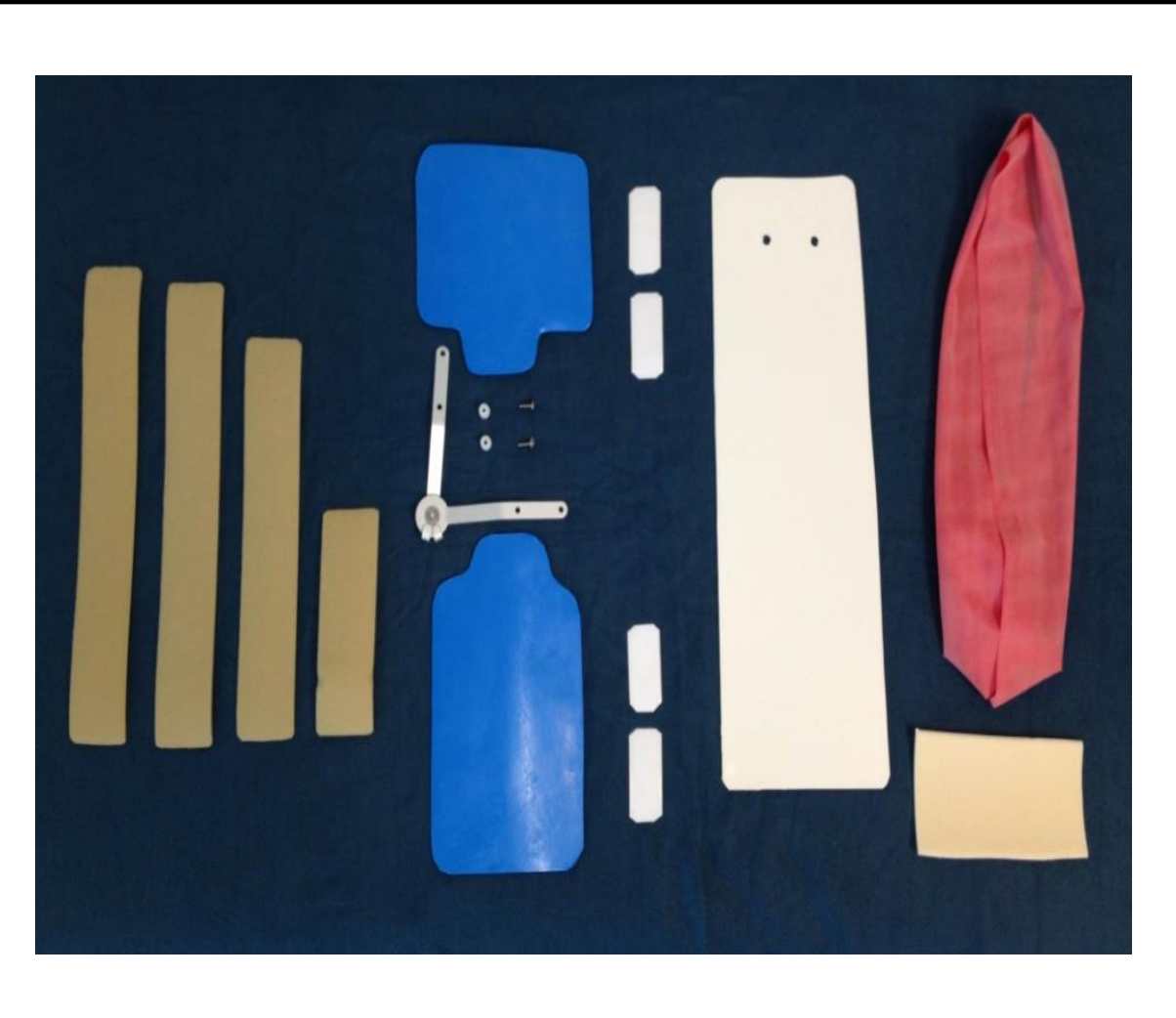
- Case study (level 4)
- A retired 69 year old man was playing golf when he felt posterior elbow pain.
- The patient developed olecranon bursitis.
- He was treated with aspiration and steroid injections 3 times by his family doctor and once more by his rheumatologist.
- 5 months later, he was walking his 100 lb dog and fell on his posterior elbow when the dog stepped in front of him.
- The patient was then diagnosed by the hand surgeon with status post right olecranon bursitis, triceps tendinitis, triceps tendon avulsion, olecranon spurring and calcification within the triceps tendon.
- The patient underwent a partial excision of the right olecranon and triceps reattachment.

Protocol:

- 3 days after surgery, patient was fitted with a hinged splint blocked at 60 degrees.
- The splint was changed to increase elbow flexion 10 degrees weekly for the next 5 weeks.
- The patient was instructed to perform active flexion to the hinge stop, and dynamic extension in the dynamic splint 6 times a day, with 20 repetitions for each set.
- A flexion hinge cover was used during the day between exercises and an extension cover was used at night.
- At 7 weeks, the patient started AROM and the splints were discharged.
- At 8 weeks, the patient started strengthening.

Supplies needed for fabrication of the orthosis:

- Straps
- Velcro
- 1 yard level 2 Theraband
- Large hinge
- Thermoplastic material
- Soft and thick padding



Rationale:

- Splint is easy to use and to modify weekly.
- Adapts to post surgical edema.

Precautions:

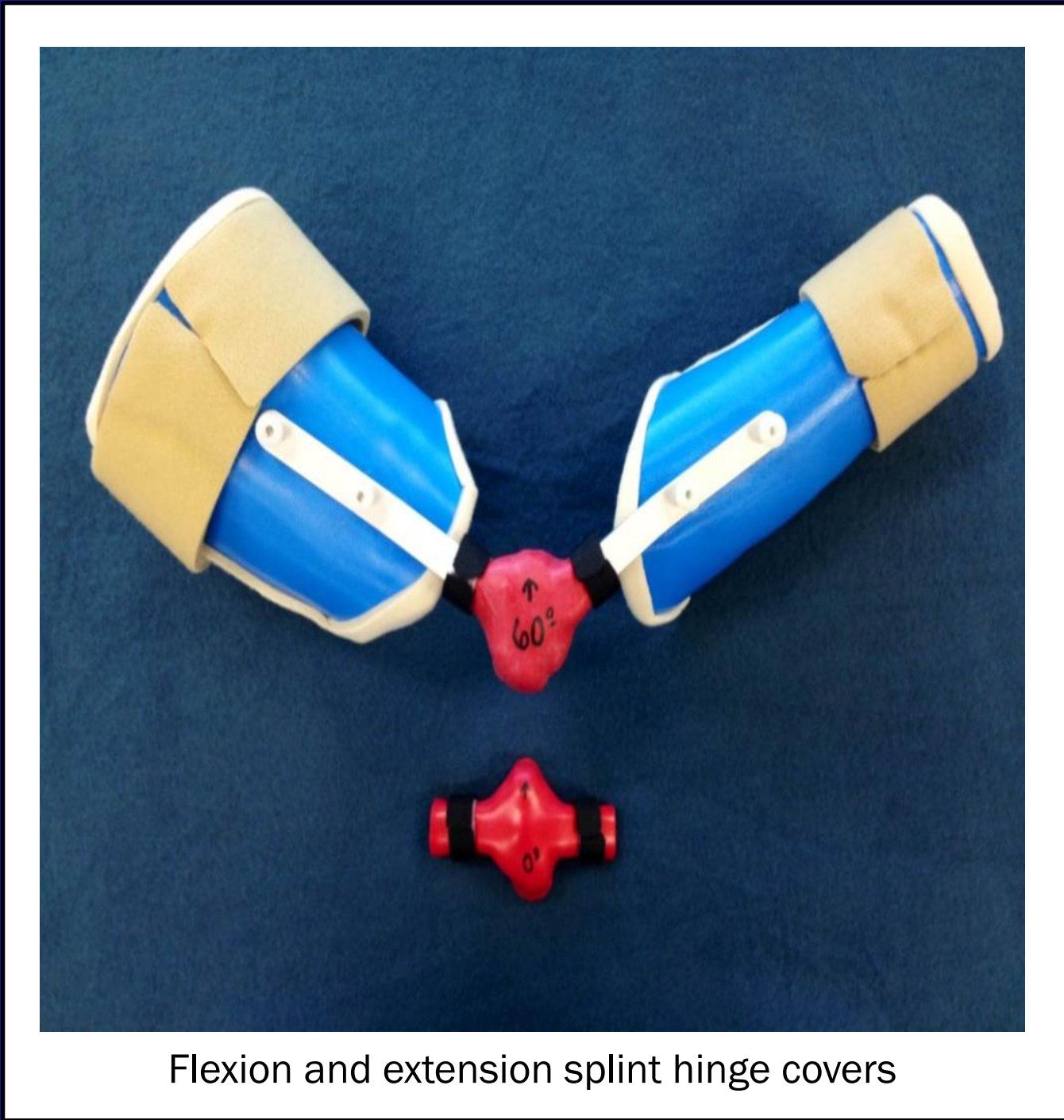
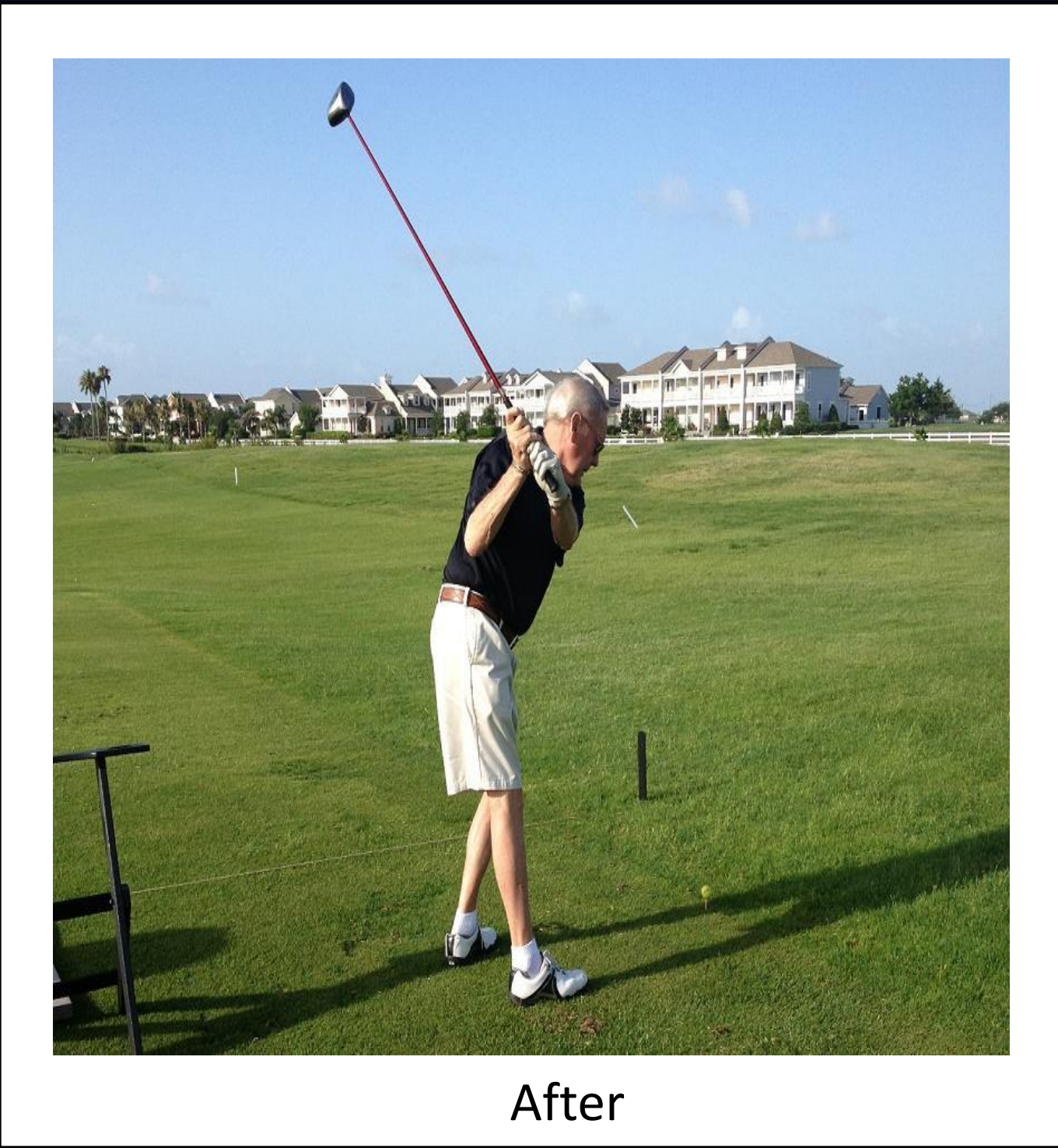
- Sit with arm at shoulder level to perform dynamic elbow extension.
- The hinge stops must be doubled to evade muscle overpowering.
- A splint cover must be used over hinge when not exercising to protect repair.

Result:

- At 7 weeks post operative, the patient presented full AROM and a pain 1/10.
- The patient was discharged from therapy at 9 weeks post operative with good functional strength, and returned to playing golf normally.

Fabrication Steps:

- Heat a 17 cm x 17 cm and a 24 cm x 14 cm piece of thermoplastic material and cut to form an arm and forearm cuff respectively.
- Mold to patient’s arm 2 cm below armpit and 2 cm proximal to elbow crease, and at the forearm 2 cm distal to elbow crease and 1 cm proximal to ulnar styloid. Pad splint edges.
- Add hinge per manufacturer recommendations.
- Set the appropriate degrees and secure with 2 hinge stops.
- Mold one splint hinge cover at full extension and one at determined flexion.
- Fabricate a 45 cm x 15 cm dynamic splint in full extension, drilling two holes at distal edge parallel to patient’s distal forearm. Flare splint edges.
- Insert Theraband and secure splint with straps proximally.
- May add thick padding under elbow if necessary.



Conclusion:

- This case report demonstrated that the combination of the surgical procedure, dynamic hinged splint, and therapeutic protocol led to an excellent outcome in treating a triceps tendon rupture.
- The results of our case study determined that the patient returned to sports and normal daily activities 3 weeks earlier than patients in previous studies.
- While early research has certainly proven to be beneficial, there is little information on the post operative management of these cases.
- Further knowledge of post-operative treatment of the triceps avulsion, as well as splinting and exercise protocols, is needed in order to create a more complete understanding of the management of this rare type of injury.

References:
Blackmore SM, Jander RM, Culp RW. Management of distal biceps and triceps ruptures. J of Hand Ther. 2006;19(2):154-68.
Badia, A, Stennett C. Sports-related injuries of the elbow. J of Hand Ther. 2006;19(2):206-26.
Greer M, Miklos-Essenber E. Early mobilization using dynamic splinting with acute triceps avulsion. J of Hand Ther. 2005: 18:365-371.