52% are associated with overuse, extensor carpi ulnaris (ECU) pathology. Injuries suffered by this tendon in golfers lead to an average of 3 missed tournaments. Despite ECU being the most frequently injured structure in the wrist/forearm of elite and sub-elite golfers, no study has captured its activity during the golf swing. It is unknown when ECU is most active in the golf swing and whether it is more active in the lead or trail wrist. The purpose of this study was to assess the timing and magnitude of muscle activity in the ECU muscle in the lead and trail forearms tri-planar angular velocity of the lead and trail hands during the golf swing in sub-elite golfers. Methods: Fifteen sub-elite right-handed golfers were recruited for this study. Data was collected utilizing an indoor swing studio with a simulator. Trials were conducted by hitting five pitching wedges, five seven irons and 5 drivers. To assess muscle activity, two wireless EMG sensors (Delsys TrignoTM Mini Sensors, MA, USA) were fixed using double-sided tape directly over the mid point of the muscle belly of the ECU on the left and right forearm with the sensor electrodes aligned perpendicular to the muscle fiber direction. Maximal voluntary contraction from the highest driver value was used as a reference for each player. Performance variables which were collected for analysis were, angle of attack (degrees), swing direction (degrees) and swing speed (miles per hour). Following the completion of the swings, the highest peak half-second EMG signal during the driver swings was used as the normalizing value (100%). Swing phases were divided into backswing, downswing and follow through using the interia measurement units (IMU) sensors placed on each distal forearm and dorsum of the hands. Statistical parametric analysis was used to compare the 303 data points for the lead and trail arms throughout the swing. Results: The mean handicap of the players was 1 (SD 2). Left ECU activity in the backswing and follow-through was significantly higher than the right for all clubs (p < 0.001 and p = 0.024 respectively). Right ECU activity in the downswing was significantly higher than left for all clubs (p < 0.001)(Figure 1-3). During the downswing, ECU activity of the lead side progressively increased towards impact, however in the trail side, ECU activity sharply peaked and then began to decline until impact. The driver had significantly higher ECU recruitment than the 7 iron and pitching wedge (p < 0.001). There was no association between ECG activity in either arm and performance characteristics. Conclusion: Despite lead sided injuries being more common, it would appear that the trail side has greater peak activity during the downswing and therefore the peak velocity of the golf swing. Knowledge surrounding the nature of tendon contraction and wrist kinematics during the downswing would be beneficial in further explaining the asymmetric nature of injuries to this tendon.

Category: Elbow/Wrist/Hand

Similar Clinical Outcomes Between Double Cortical Button and Docking Techniques for Ulnar Collateral Ligament Reconstruction in Baseball Players

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Summary:
Post-operative outcomes were similar between baseball players who underwent UCLR with the double button technique and the docking technique.

Data:
Objectives: A double button technique using a cortical button on both the humeral and ulnar sides of the ECU for fixation has recently been proposed, with advantages including greater control over graft tensioning and decreased risk of bone tunnel fracture. This double cortical button technique was recently evaluated biomechanically and found to be non-inferior to the traditional docking technique regarding strength, joint stiffness, and graft strain. However, clinical outcomes have not been compared between the double cortical button technique and standard UCL techniques such as the docking technique. Therefore, the purpose of this study was to determine whether baseball players who underwent UCLR with a double cortical button (double button) technique have similar return to sport (RTS) rates, time to RTS, and subjective outcomes compared to baseball players who underwent UCLR with the traditional docking (Docking) technique. Methods: Competitive baseball players that underwent primary UCLR from 2011-2020 at across two institutions were identified using the CPT code 24346. Patients were excluded if they were not baseball players or if they did not undergo UCLR with the double button or docking technique. Included patients were contacted via RedCap to complete a follow-up survey evaluating reoperations, RTS, functional outcome scores, and patient satisfaction. Functional outcome surveys include the Kerlan-Jobe Orthopaedic Clinic (KJOC) score, Conway-Jobe score, Andrews-Timmerman (AT) elbow score, and the Single Assessment Numeric Evaluation (SANE) score. Results: Overall, 78 male baseball players (age: 18.9 ± 2.4 years) with an average follow-up of 3.1 ± 2.4 years were evaluated, with 73 of the players being baseball pitchers and 55 (71%) of players completing the functional outcome surveys. Players in the double button group more frequently received palmaris longus autographs (78% vs. 30%) and less frequently received both gracilis autographs (22% vs. 58%) and allografts (0% vs. 13%) compared to players in the docking group (p < 0.001); however, all other demographic factors were similar between groups. All post-operative and patient-reported outcomes were also similar between groups. All players in the double button group (100%) were able to RTS in 11.1 ± 2.6 months, while 96% of players in the docking group were able to RTS in 13.5 ± 3.4 months (p > 0.05). All other post-operative outcomes and patient-reported outcomes were statistically similar between groups, and remained similar after isolating pitchers only and after separating partial-thickness from full-thickness UCL tears (p > 0.05). Two complications were observed in the docking group, with one player experiencing pain at elbow extension due to nerve neurolysis and another player developing an elbow stress fracture during rehabilitation, while no double button players experienced a complication. Conclusions: Post-operative outcomes were similar between baseball players who underwent UCLR with the double button technique and the docking technique. These findings provide the first clinical outcomes in support of a recent cadaveric study which showed the double button technique to provide similar elbow strength, joint stiffness, and graft strain compared to the docking technique. Larger comparative studies are necessary before a clear clinical recommendation can be made regarding the utilization of double button UCLR for baseball players.

Category: Elbow/Wrist/Hand

A Radiostereometric Analysis of Tendon Migration Following Arthroscopic and Mini-Open Biceps Tenodesis: Interference Screw Confers Greater Construct Stability than All-Suture Suture Anchor Fixation, with No Difference in Patient-Reported Outcomes

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Summary:
Arthroscopic suprapectoral (ASPBTT) and open subpectoral (OSPBTT) techniques via interference screw (IS) fixation demonstrated the least tendon migration, while OSPBTT with one all-suture anchor with a single suture fixation yielded the most.

Data:
Purpose: To quantify the postoperative migration of the BT construct between arthroscopic suprapectoral (ASPBTT) and open subpectoral (OSPBTT) techniques via interference screw (IS) or all-suture anchor with a single suture (SSSA) fixation with radiostereometric analysis (RSA). Methods: Distal migration of the biceps tendon following OSPBTT with a Polyetheretherketone (PEEK) IS, OSPBTT with one SSSA, ASPBTT with PEEK IS, and ASPBTT with two SSSAs was measured prospectively. Patients with symptomatic biceps teninopatby and preoperative Patient-Reported Outcome Measures (PROMs) including CMS, SANE, or PROMIS-UE scores were included. A tantalum bead was sutured on the proximal end of the long head biceps tendon before fixation. AP radiographs were performed immediately post-operatively, 1 week, and 3 months. Bead migration was measured, and PROMs were compared. Results: Of 115 patients, 94 were available for final follow-up (82%). Average age was 52±10.5 years, and BMI was 30.8±5.4 kg/m2. There was no difference in tendon migration between OSPBTT and ASPBTT performed with an IS.