Gelatin and Vitamin C intervention in college football athletes: Retrospective case studies.

Emma Nelson, Tiffany Harrison, MS, RD, CSSD, LDN, Kris Vander Wilt MS, LAT, ATC

Middle Tennessee State University
Undergraduate Research Center

OBJECTIVES

1. Accelerate return to play by minimizing duration of musculoskeletal soft tissue injury repair in two athletes with existing injuries.
2. Determine the effectiveness of gelatin and vitamin C on collagen synthesis and injury healing.
3. Assess the impacts of sports nutrition education and intake tracking on overall dietary improvement and injury healing.

BACKGROUND

- Musculoskeletal soft tissue injuries account for 70% of all injuries in American Football (Feeley 2008).
- Gelatin enriched vitamin C supplementation has been tested on genetically engineered ligaments (Paxton 2010, Paxton 2012).
- Collagen synthesis with this supplementation has been studied in non-injured human participants, but research studies in humans with existing injuries are lacking (Shaw 2017).

CASE DESCRIPTIONS

ATHLETE A

Injury Description and Surgical Repair: Athlete A sustained an anterior labral tear in his shoulder. Athlete wore a brace for football season and underwent a Latarjet procedure during post-season.

ATHLETE B

Injury Description and Surgical Repair: Athlete B ruptured his pectoralis major muscle and underwent surgical repair the following month.

Nutrition Assessment: Upon initial assessment, both athletes reported skipping meals, little knowledge on balancing nutrient-dense meals, and time related barriers due to daily schedules impacting nutrition intake. On average, both lost 5-7lbs following their injuries.

METHODOLOGY

Training Interventions

ATHLETE A

For the first 4 weeks of rehabilitation, the athlete's shoulder was immobilized and he performed hand, wrist, and elbow exercises. After 4 weeks the athlete began shoulder range of motion and strengthening exercises. The athlete completed an anterior labral tear rehabilitation protocol for approximately 5 months and 3 weeks post-surgery, and was cleared to fully return to all football activities.

ATHLETE B

For the first 2 weeks of rehabilitation, the athlete's shoulder was immobilized, and he performed hand, wrist, and elbow exercises. After 2 weeks the athlete began shoulder range of motion, but remained in a sling until 6 weeks post-surgery. The athlete completed a pectoralis tendon repair rehabilitation protocol for 5 months and 1 week post-surgery, and was cleared to fully return to all football activities.

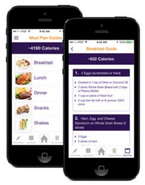
Nutrition Interventions

Initial dietary assessment and nutrition education were conducted with a registered dietitian (RD). Education emphasized consistent and balanced meal consumption of nutrient dense foods. The athletes were introduced to the Athlete's Plate aimed at building a balanced meal. RD discussed strategies on meal preparation at home, increasing protein for healing, tracking intake, and protein rich snack before bed. Supplementation of gelatin and vitamin C 30-60 minutes prior to rehabilitation and activity.

The Athlete's Plate

The Athlete's Plates are a collaboration between the United States Olympic Committee Sport Dietitians and the University of Colorado (UCCS) Sport Nutrition Graduate Program. For educational use only.

Nutrition Tracking

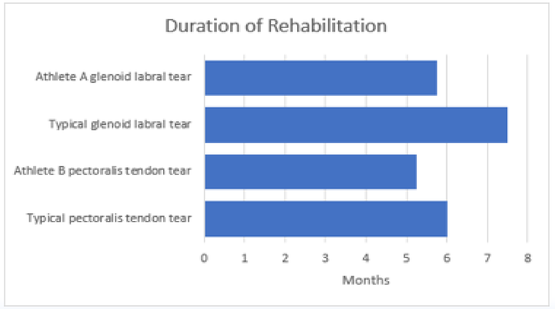


Intake was monitored through an electronic food record (EFR) application. The application enables users to photograph meals and receive timely feedback from the RD. This tracker was utilized due to its simplicity and nature of the athletes' busy schedules.

Supplementation

The RD ordered supplementation for the athletes prior to rehabilitation sessions and activity. Athletes were to consume gelatin and vitamin C 30-60 minutes prior to rehab or activity. The athlete mixed gelatin (15 g) in room temperature sports drink or water and obtained vitamin C (500 mg) from Athletic Trainer (ATC).

OBSERVATIONS AND OUTCOMES



Athlete A Follow Up Report

7 days post initial assessment: balanced meals, inconsistent use of EFR, pre-sleep protein rich ultra filtered milk and cereal, and daily use of gelatin and vitamin C	**1 month post** initial: increased range of motion in shoulder with no pain, cooking attempts, meal consistency without skipping, and return to pre-injury weight	**2 months post initial:** lifting heavier weights, resolved shoulder pain when consistent with supplement, inconsistent use of EFR, and success referencing the Athlete's Plate model	**3 months post initial**: weight maintenance, continued progress with meal balance and consistency, and ATC estimates athlete to resume regular training in 4 weeks

Athlete B Follow Up Report

14 days post initial assessment: consistency with supplementation, no use of EFR, photo taking of meals with smart phone, use of Athlete's Plate model, and pre-sleep eggs or protein shake	**2 months post initial:** meal consistency without skipping, weight maintenance since last visit, continued consistency with Athlete's Plate model, and good progress in rehab noted by ATC	**Note:** Athlete B's busy schedule did not allow for more frequent meetings for in office follow ups. RD often spoke briefly with athlete to reinforce concepts during rehab by reviewing photos taken of meals by the athlete.

DISCUSSION

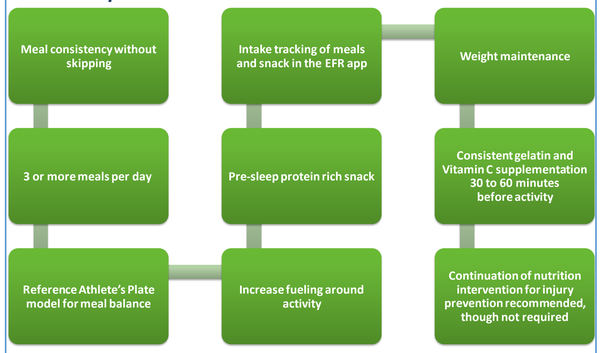
ATHLETE A

Athlete A was compliant with training and nutrition interventions which likely related to his success. He attended follow-ups with the RD regularly. The additional accountability may have played a role in his overall outcome. This athlete's rehab time was likely shortened by up to 3 months due to adherence to the training, supplementation protocol, and improvement of diet.

ATHLETE B

Athlete B was compliant to training and nutrition interventions, however, reported struggling with time as a barrier from daily schedule. As a result, Athlete B had less in-office, nutrition focused sessions with the RD as compared to Athlete A. Supplementation, improvement in diet, and reinforcement of concepts likely aided in his recovery, accelerating return to play by about 1 month faster than average.

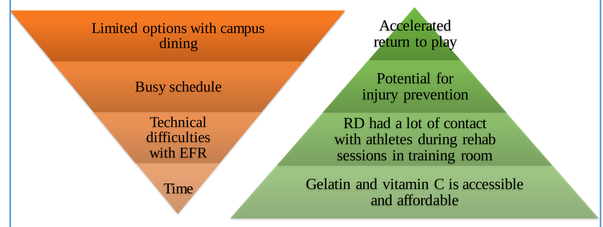
Review of Goals



Sports Nutrition Education

Both athletes' nutrition status improved as a result of education by implementing meal consistency, balance, and increased protein intake. The education they received was advantageous to the expedition of both athletes' recovery. This portion of the intervention was inspired by various studies that demonstrate the positive effects of sports nutrition education on overall dietary intake (Heikkilä 2019, Elias 2018, Karpinski 2012). Interestingly, the Heikkilä study supports the fact that nutrition education alone is less impactful without a food diary tool and RD feedback (2019).

Barriers and Advantages



CONCLUSION

With few human studies to date, this case study demonstrates a potentially promising impact of nutrition intervention on athlete recovery of soft tissue injury. The prevalence of nutrition intervention in the recovering athlete increases as sports nutrition research improves. This retrospective case study assessed the use of gelatin (15 g) and vitamin C (500 mg) supplementation in combination with nutrition education, a dietary plan, and intake monitoring alongside rehabilitation. The interventions were likely beneficial in shortening the rehabilitation period for musculoskeletal soft tissue injuries and accelerating return to play. The effects of athlete compliance level on the outcomes remains in question. Future research incorporating the aforementioned nutrition interventions in the injured athlete should investigate the potential benefits of vitamin C and gelatin supplementation with a larger sample size and stricter compliance measures for better adherence.

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