Micronized Amniotic Membrane for Muscle and Ligament Tears in Collegiate Football Athletes: A Single-Center, Retrospective Study

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Introduction

Football is a leading cause of sports-related injuries, accounting for more than half of time-loss injuries in men's collegiate sports.[1] Despite the high prevalence of injury, there is ongoing debate as to which therapeutic interventions are most effective in treating muscle, ligament, and tendon injuries in athletes. While corticosteroid and local anesthetic injections have been commonly used, use of these treatments is generally avoided in tendon pathologies and higher-grade muscle or ligament tears due to the risk of degeneration and rupture.[2,3]

Micronized Amniotic Membrane (AM) injection is a novel treatment that has been used for a variety of musculoskeletal disorders manifesting pain including plantar fasciitis, knee osteoarthritis, rotator cuff tears, and lower extremity neuropathy.[4-6] Yet, there are no studies related to accelerating functional recovery in high-level athletes. Herein, we evaluated micronized AM in collegiate athletes with sport injuries and assessed functional recovery and return to play.

Materials

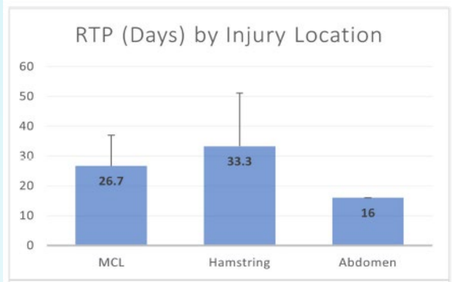
A single-center, retrospective chart review was performed on consecutive college football players who sustained acute muscle or ligament tear and subsequently received micronized AM injection (Clarix® Flo; BioTissue, Inc, Miami, FL). Data collection included patient demographics, diagnosis, grade and extent of injury, position of the player, time to return to play (days), and complications. For tear severity, a modification of Peetrons classification was used with the following grading system: grade 0 negative MRI without any visible pathology, grade 1 edema but no architectural distortion, grade 2 architectural disruption indicating partial tear and grade 3 total muscle or tendon rupture.

Results

Ten athletes with tears of the medial collateral ligament (n=3), hamstring (n=6), and abdomen (n=1) were included for analysis. The majority (n=6) of tears were partial (grade 2), with partial to full tears (grade 2±3) noted in 2 patients, and a complete tear (grade 3) noted in 2 patients.

All patients were initially treated with athletic training directed treatment modalities, physical therapy specific to their injury by a certified physical therapist, activity modification, and nonsteroidal anti-inflammatory medications for 7 days. Patients received adjunctive injection of either 50 or 100 mg AM within 5 days of injury, which was reconstituted in 2cc of 1% lidocaine without epinephrine and injected directly at, above, and below the injury site. The injection was performed uneventfully in all cases.

Athletes returned to play 29.6 ± 15.2 days post-injury, with 80% of athletes returning to play within 4 weeks. Injury grade, BMI and AM dose were not significantly correlated with time to return to play. No complications or re-injuries occurred during the follow-up period of 6 months.



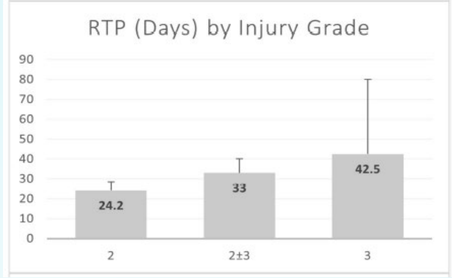


Table 1. Injury Characteristics and Treatment Outcomes by Case

Case	Location	Age (years)	Position	BMI (kg/m²)	Grade	Dose (mg)	Limited RTP (Days)	RTP (Days)
1	MCL	19	DB	25	2	100	16	18
2	MCL	19	OL	34	2	100	18	24
3	MCL	19	OL	37	2±3	100	29	38
4	Hamstring	20	WR	23	2	50	21	28
5	Hamstring	21	OL	25	2	100	20	27
6	Hamstring	20	DL	36	2	50	19	28
7	Hamstring	20	RB	30	2	50		20
8	Hamstring	21	LB	30	3	50		69
9	Hamstring	18	WR	23	2±3	50		28
10	Abdomen	21	WR	22	3	100	10	16

Krystofiak J. Injection of Amniotic Membrane and Umbilical Cord Particulate for Muscle and Ligament Tears in Collegiate Football Athletes: A Single-Center, Retrospective Study. *Orthop Res Rev*. 2024;16:295-301

Conclusion

Micronized AM is a safe treatment and was used adjunctively to enable quick return to play in this cohort of football players suffering from muscle or tendon tears.

Prospective, randomized, blinded studies are warranted to verify whether injection of AM can hasten return to play compared to standard treatment alone.

References

1. Powell JW, Dompier TP. Analysis of Injury Rates and Treatment Patterns for Time-Loss and Non-Time-Loss Injuries Among Collegiate Student-Athletes. Journal of athletic training. 2004;39(1):56-70
2. Drakos M, Birmingham P, Delos D, et al. Corticosteroid and Anesthetic Injections for Muscle Strains and Ligament Sprains in the NFL. HSS journal : the musculoskeletal journal of Hospital for Special Surgery. 2014;10(2):136-142.
3. Sellman JR. Plantar fascia rupture associated with corticosteroid injection. Foot & ankle international. 1994;15(7):376-381.
4. Ackley JF, Kolosky M, Gurin D, Hampton R, Masin R, Krahe D. Cryopreserved amniotic membrane and umbilical cord particulate matrix for partial rotator cuff tears: A case series. Medicine. 2019;98(30):e16569.
5. Hanselman AE, Tidwell JE, Santrock RD. Cryopreserved human amniotic membrane injection for plantar fasciitis: a randomized, controlled, double-blind pilot study. Foot & ankle international. 2015;36(2):151-158.
6. Castellanos R. Amniotic Membrane and Umbilical Cord Particulate for Pain Associated with Knee Osteoarthritis: Preliminary Results of a Single-center, Prospective, Pilot Study. Pain physician. 2018;21:E289-E305.