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Enhanced mechanical properties of rabbit flexor tendons in response to intratendinous injection of adipose derived stromal vascular fraction.

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Abstract

INTRODUCTION: Tendon injuries are notorious for slow and functionally inferior **healing**. It is claimed that **cell**-based therapy would result in faster and more efficient **healing** of injured tissues with less postoperative complications. Given the limitations associated with ex vivo cellular expansion, we tried to evaluate the possible effects of intratendinous injection of **adipose** derived stromal vascular fraction on mechanical properties of **tendon repair**.

METHODS: The model of injury was complete sharp transection of rabbit deep digital flexor **tendon** followed by primary suture **repair** and an intratendinous injection of either allogeneic stromal vascular fraction or placebo. **Tendons** were harvested at three and eight weeks after surgery.

RESULTS: The results of mechanical testing showed the treatment caused significant increase in ultimate and yield loads, stress, and energy absorption of repairs compared to controls at both time points. Also, improvement in terms of strain and stiffness were detected at the eighth week in treatments.

DISCUSSION: In comparison with the result of previous studies using cultured mesenchymal **stem cells** from bone marrow or **adipose** tissue; the improved mechanical properties observed in the present study suggest that choosing stromal vascular fraction as a readily accessible and instant source of multipotent **cells** instead of expensive and long-lasting culture expansion may seem more favorable in **cell** based therapy for **tendon** injuries. The mechanical functionality of the repairs observed in the present study encourages further investigations into the use of stromal vascular fraction for the **repair** of **tendon** injuries.

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