

Platelet-rich plasma (PRP) and tendon healing: Animal model.

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Introduction:

The tendon is a tissue which does not heal easily. Recently, several studies have demonstrated the positive effects of platelets on the healing process of tendons. A local injection of platelet-rich plasma (PRP), which releases in situ many growth factors, has the potentiality to enhance the tendon healing process. The aim of our experiment was to ascertain by an original mechanical measure whether the use of PRP was of interest for accelerating the healing process of rats' Achilles tendons after surgical induced lesion.

Methods:

A 5mm defect was surgically induced in 90 rats' Achilles tendon. Rats were divided into 2 groups of 45: (A) control (no treatment) and (B) PRP treatment. Rats of group B received a PRP injection in situ after the surgery. Afterwards, rats of both groups were placed in their cages without immobilization. After 5, 15 and 30 days, 10 traumatized Achilles tendons of each group were dissected and removed. Immediately after sampling, tendons were submitted to a biomechanical tensile test up to rupture, using a "Cryo-jaw". After that, transcriptomic analyses were made on the tendon samples, to study the expression of type III collagen, matrix metalloproteases and tenomodulin. A hydroxyproline dosage was done to quantify the collagen in the tendon during its healing process. Tendons of the 15 remaining rats of each group were subjected to a histological study, respectively at day 5, 15 and 30 (5 rats for each time).

Results:

We demonstrated that the force necessary to induce tendon rupture during biomechanical tensile test study was greater for tendons which had been submitted to an injection of PRP compared to the control group: +19% (day 5), +30% (day 15) and +43% (day 30). Histological study showed that PRP could enhance cells proliferation, angiogenesis and collagen organisation. Our biochemical analyses did not explain beneficial effects of PRP. Indeed, there was no significant difference neither between the expression of different studied genes, nor in the quantity of hydroxyproline between both groups.

Conclusion:

This experimentation has shown that a PRP injection could accelerate the tendons healing process and improve its quality.

Keywords:

Platelet-rich plasma, tendon, healing