

Intraoperative adipose stem cells administration during secondary release (neurolysis) of reconstructed nerve – pilot study.

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Abstract

Reconstruction of the nerve continuity after traumatic injury of peripheral nerve is a golden standard in hand surgery. Immediate, tension-free, end-to-end reconstruction ensures the best prognosis. The recovery is mostly promising, however in few cases insufficient results of sensory or motor functions are achieved. Intra- and extra- fascicular scarring accompanies nerve regeneration process and limits final outcomes. Secondary nerve release in those cases is recommended. Unfortunately, scarring recurrence can not be excluded after secondary revision and neurolysis. The aiding role of mesenchymal stem cells (MSC) in process of nerves regeneration as well as their anti-scarring properties were observed in many preclinical studies. However, limited number of studies in humans still concerned their clinical usage.

The aim of the study was an evaluation of undifferentiated adipose derived stromal/stem cells (ADSC) usage during last chance surgery (neurolysis, nerve release) of previously reconstructed nerve. Three patients after failure median and ulnar nerves reconstruction in past were included into the study. During revisional surgery nerve fascicles were release and ADSC were isolated from harvested fat in one-step procedure. The cells were administered through microinjections after nerve external neurolysis along the fascicles and around the adjacent tissues. During 36 months of follow-up patients noticed gradually signs of recovery of sensory and in consequence motor function. No adverse effects were noticed.

Simultaneous nerve release with ADSC support is promising method in patients who need secondary nerve release after nerve reconstruction. This method could constitute an alternative procedure in patients with failure recovery and allow to expect encouraging improvement in cases of limited nerve regeneration.