



## Commentary

## Stem cell therapy as an adjunct to surgery

Mesenchymal stem cells have been shown to have therapeutic benefit in treatment of several different organ systems, including the heart, lung, and bone. In their study, Wang et al. [1] conducted a comprehensive review and meta-analysis using randomized controlled trials to investigate bone mesenchymal stem cell (BMSC) therapy in the treatment of osteonecrosis of the femoral head (ONFH). The study included 14 studies, with a sample size of 540 patients. Of these, 275 patients were treated for osteonecrosis of the femoral head utilizing core decompression and MSCs, while 265 patients were treated with core decompression alone. The primary outcome for this analysis was the visual analog scale (VAS) at 6 months, 12 months, and 24 months.

As addressed in the authors analysis, clinical efficacy of core decompression in combination with autologous BMSCs in the treatment of ONFH patients has been explored, however the results have been shown to be inconsistent [2]. When comparing the two patient populations, it was derived that the group being treated with core decompression and MSCs showed a significant decrease in the VAS score at 6 months, 12 months and 24 months. In addition, the group receiving BMSC therapy had a decrease in the number of hips undergoing total hip arthroplasty (THA), lower Western Ontario and McMaster Universities (WOMAC) score, and smaller volume of postoperative necrotic zone. Combined utilization of core decompression and autologous MSCs had better pain relief and delayed collapse of the femoral head more effectively. These findings not only corroborate evidence that BMSCs are efficacious in treatment of patients with osseous and cartilaginous defects [3], but the application of mesenchymal stem cells (BMSCs) are advantageous in a multitude of degenerative disorders [4].

While this study accomplished the goal of providing evidence for the application of MSCs in treatment of ONFH, many unanswered questions still exist. The study did not investigate the cellular mechanisms resulting in therapeutic benefit, the optimal isolation techniques for MSC therapy, and whether certain lineages of BMSC are more effective than others [5]. The optimal cellular concentrations and mechanism of delivery have also not been determined. It would have been beneficial to understand these variables for future study, replication, and application.

Overall, the benefit of utilizing BMSCs in the treatment of degenerative disease is evident. The results of this meta-analysis should stimulate interest and promote future research and investigation into the application of autologous BMSCs in degenerative disease processes. It also strengthens the principle of using operative intervention to not only repair injury, but to also deliver cellular therapeutics to the diseased tissue. There is still much information to be gleaned about BMSCs and many questions remain, however this study provides compelling results for current and future implementation of BMSCs in degenerative disease.

## References

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