

Treatment of Disc Herniation with PRP with epidural platelet releasate (growth factor concentrate)

The weight-bearing bones of the spine are separated by fluid-filled discs. If these discs bulge or herniate, there is a potential for pain as well as compression of the nerves of the spinal cord. If nerve compression is severe, or prolonged, permanent nerve damage can ensue. There are several treatment options for herniated discs ranging from conservative (watchful waiting, Physical Therapy) to very invasive (surgery). If pain is a prominent symptom, we can try medications or epidural steroid injections to help reduce the inflammation contributing to pain and swelling. Sometimes, epidural steroid injections can reduce pain while the body tries to fix the lesion.

It is well-established in literature that the body can resorb, or "eat up", these disc herniations, especially if they are large.¹⁻² But, this may take several months and the process may be incomplete. During this time, it is important to monitor for unchanging or worsening symptoms. An objective measure we may employ during this time is using a nerve conduction test (EMG/NCS) to characterize the extent of nerve damage as well as the degree of recovery.

If pain, weakness, numbness/tingling or other neurologic symptoms are not improving, or are worsening, a more definitive intervention is warranted. This may include surgery or a relatively safer procedure of injecting concentrated growth factors (also known as platelet lysate or releasate) around the herniated disc. The latter procedure is a cutting edge therapy that has been a focus at our clinic. I've personally seen remarkable results with this treatment choice and have been able to spare numerous patients from having to resort to surgical alternatives. Installation of concentrated growth factors around a herniated disc can hopefully initiate or accelerate the healing process the body is trying to accomplish (but is perhaps doing a suboptimal job). This healing cascade can manifest through a variety of mechanisms that are directed by the signaling proteins in the growth factor concentrate.³ There is a complex interaction between the proteins and the injured tissues from which physiologic changes occur. The table below ³ illustrates some of the general mechanisms by which these proteins work in the body.

Growth factor*	Effect	PRP concentration (ng)
PDGF	Macrophage activation and angiogenesis	αβ 117.5 ng/ml (63.4)
	Fibroblast chemotaxis and proliferative activity	ββ 9.9 ng/ml (7.5)
	Enhances collagen synthesis	
	Enhances the proliferation of bone cells	
TGF-β	Enhances the proliferative activity of fibroblasts	β1: 169.9 ng/ml (84.5)
	Stimulates biosynthesis of type I collagen and fibronectin	β2: 0.4 ng/ml (0.3)
	Induces deposition of bone matrix	
	Inhibits osteoclast formation and bone resorption	
IGF-I	Chemotactic for fibroblasts and stimulates protein synthesis	84.2 ng/ml (23.6)
	Enhances bone formation by proliferation and differentiation of osteoblasts	
PDEGF	Promotes wound healing by stimulating the proliferation of keratinocytes and dermal fibroblasts	470 pg/ml (320)
PDAF	Induces vascularisation by stimulating vascular endothelial cells	
PF-4	Stimulates the initial influx of neutrophils into wounds	8.189 nmol/ml (0.07)
	A chemoattractant for fibroblasts	
	A potent antiheparin agent	
EGF	Cellular proliferation	51 pmol/l (5)
	Differentiation of epithelial cells	
VEGF	Angiogenesis	76 to 854 pg/ml
	Migration and mitosis of endothelial cells	
	Creation of blood vessel lumen	
	Creates fenestrations	
	Chemotactic for macrophages and granulocytes	
	Vasodilation (indirectly by release of nitrous oxide)	
* PDGF, platelet-derived growth factor; TGF, transforming growth factor; IGF, insulin-like growth factor; PDEGF, platelet-derived endothelial growth factor; PDAF, platelet-derived angiogenesis factor; PF-4, platelet factor 4; EGF, endothelial growth factor; VEGF, vascular endothelial growth factor		

Figure 1: Physiologic effects of platelet-derived growth factors. This is a partial list with concentrations listed from common methods of PRP processing. Our concentrations far exceed these numbers. (chart obtained from reference 3 below).

Through independent research conducted through our clinic, and in collaboration from a university laboratory, we have discovered a proprietary technique of optimizing the concentration of growth factors that is significantly more robust compared to several widely-established processing methods. The

application of this research has shown in our clinical success stories. Below are a couple of case reports showing the power of this novel type of therapy.

Case 1

The first case is of an 86 year old gentleman who came to us with right leg pain numbness and weakness. We sent him for an MRI. The first two pictures show the large herniated disc that was compressing a nerve to his leg.

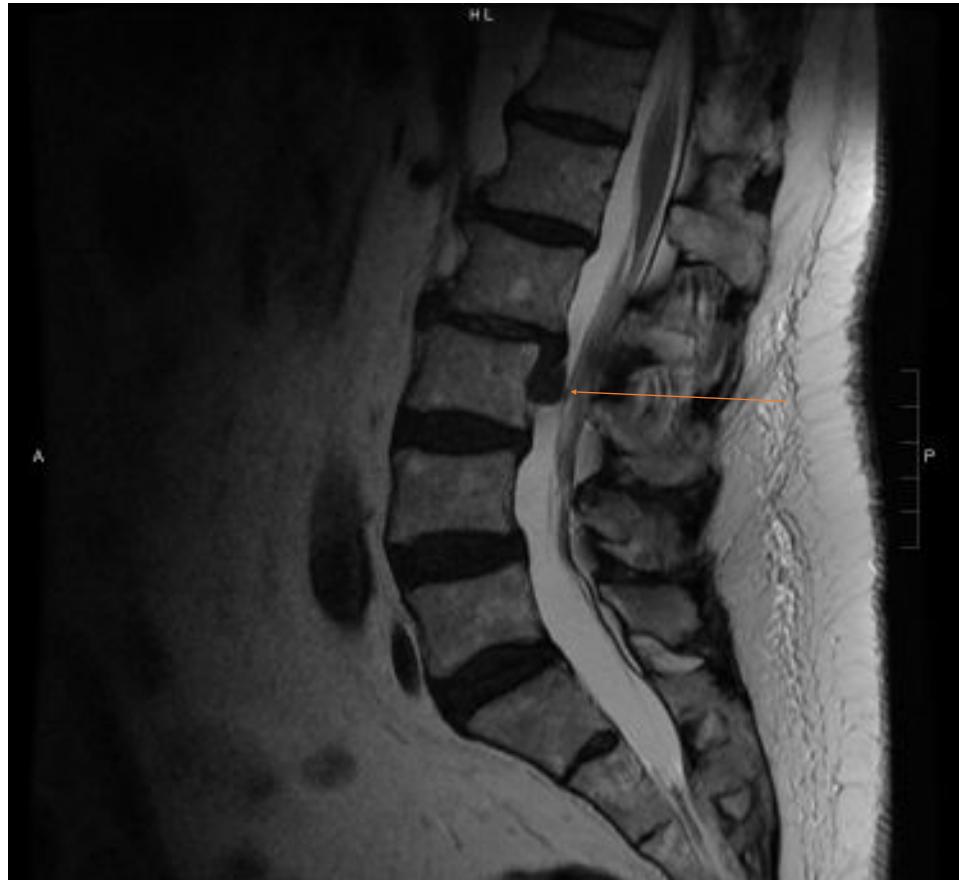


Image 1: Side view of the lumbar spine before treatment.



Image 2: Cross-section view of the lumbar spine before treatment.

His pain improved with an epidural steroid injection and he decided to pursue a conservative course of treatment with physical therapy for ongoing weakness and numbness. Despite 3 months of therapy, his weakness and numbness were worsening and his pain had returned. He was declining. We discussed surgery versus PRP with epidural growth factors and he opted to pursue the regenerative medicine injection therapy. After two injections, he described improved function, decreased pain and improved strength. His numbness was improving, but still present. We repeated an MRI to monitor for progress and were happy to see the following results:



Image 3: Side view of the lumbar spine before treatment.



Image 4: Cross-section view of the lumbar spine after treatment.

It is obvious that there was a significant reduction in the size of the herniated disc.

Case 2

The next case involves a 48 year old female who presented to me with severe neck and left arm pain along with profound weakness. We discussed surgery as an option, but she wanted to avoid this, so we proceeded with PRP to the cervical spine with epidural growth factors. After three total treatments, she had almost complete relief of pain and regained full strength. She was able to stop all pain medications and continues to be symptom-free years later. Below are comparison films from before and after treatments.



Image 5: Side view of the cervical spine before treatment. Note the impingement of the spinal cord.

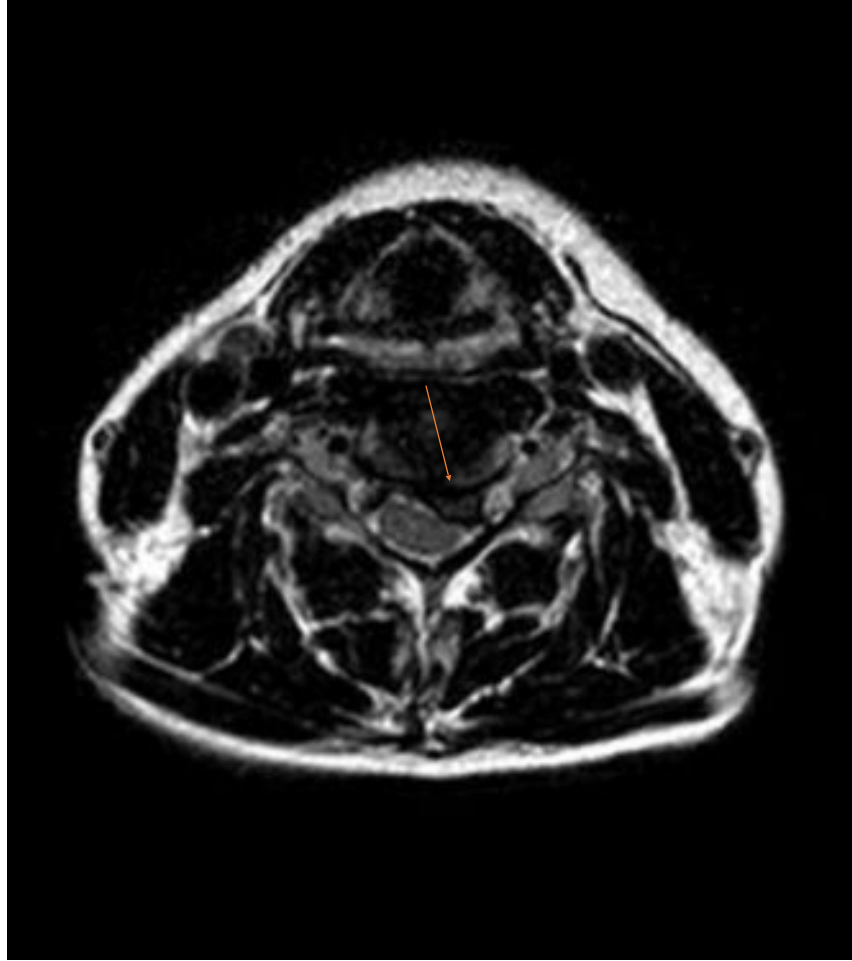


Image 6: Cross-section view of the cervical spine after treatment.



Image 7: Side view of the cervical spine after treatment.

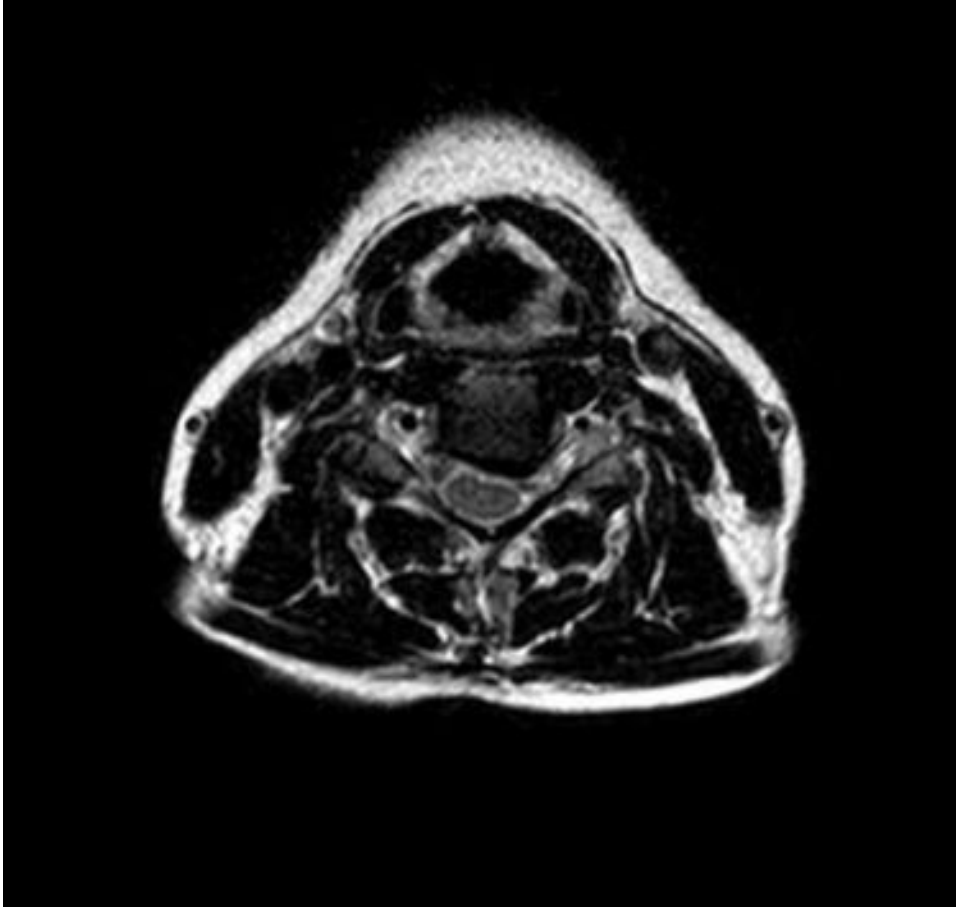


Image 8: Cross-section view of the cervical spine after treatment.

These are profound examples of the types of success we are experiencing with this exciting form of treatment. This treatment tool is an excellent addition to the other forms of regenerative medicine that we may employ at CHARM. After treating the disc with epidural growth factors, I use the remaining PRP to treat the structures (ligaments, tendons, facet joints) that provide stability to the spine. When patients are able to tolerate an increased level of activity, I generally recommend Physical Therapy to help improve muscle strength and stability along with promoting proper movement patterns. Stabilizing the spine in this manner is paramount to reducing pain further and mitigating further degeneration.

Our clinical outcomes are enhanced by adhering to a thorough evaluation and discussion of treatment options along with properly vetting patient for the right treatment, utilizing an in-house laboratory with advanced processing techniques along with concurrently retraining the neuromuscular system through our Physical Therapists. This comprehensive approach has contributed to tremendously successful outcomes when we employ this treatment strategy. These factors have contributed to our standing as ongoing national leaders in the field of regenerative medicine.

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A REVIEW OF THE LITERATURE

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