THE PROBLEMS WITH
CORTISONE INJECTIONS

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The Problems with Cortisone Injections

Introduction
This free report is compiled from excerpts taken from the Regenexx® Website. Our goal is to provide information that will help you make the right choice for you.

What are cortisone steroid injections?
Cortisone steroid injections in the knee, shoulder, ankle, or back are a common treatment to manage swelling and reduce pain. In commonly used dosages (usually in milligrams), these drugs are very powerful anti-inflammatories. However, these doses may be too powerful as research shows that there are many negative side effects associated with cortisone steroid injections.

What happens to the body when cortisone steroids are administered?
Common issues include problems with blood sugar handling in diabetics, changing the normal cortisol control system in the body, and killing off cartilage and stem cells. For example, a study in Joint Bone Spine looked at what happened to patients after a steroid epidural (used for low back pain and sciatica) and an intra-articular (inside the joint) injection of steroids. In diabetic patients, there was a significant increase in blood sugar levels that lasted for about 1 week. The most concerning changes occurred in the body's own cortisol system and they lasted for over 3 weeks, post-epidural steroid injection. This cortisol suppression hinders the body's ability to manage infections, control blood sugar levels, and regulate other important bodily functions involved in the metabolism of processing foods. Is there any other evidence that shows that steroid injections may be a problem?

What does cortisone steroids do to the ligaments and cartilage?
Repeated joint injections of steroids have been associated with greater cartilage breakdown in animal models. In our closest animal relative (primates), repeated steroid shots have been shown to cause ligament failure and breakdown. Even at much lower doses than those commonly used by doctors to inject into joint (about 100 times less), certain steroids still kill cartilage cells. In particular, a steroid suspension containing the preservative benzalkonium chloride was very toxic toward cartilage cells, with the preservative being the main offender. Even without the preservative, steroids have still been shown to kill cartilage cells (called chondrocytes). Even steroids given orally to help swelling can lead to cartilage degeneration.
In particular, steroids combined with local anesthetic (the most common way steroid is injected into joints), makes the steroid even more toxic to cartilage cells.
How do steroids impact your stem cells?
Steroids negatively impact your stem cells just as they do to other tissues in your body. Studies have shown that steroids reduced the ability of bone stem cells to make new bone and that patients taking oral steroids are more susceptible to developing avascular necrosis of the bone (death of bone maintaining stem cells).

Are Steroid Shots Bad for Tennis Elbow?
A study published by MedPage Today analyzed data from other studies and stated that steroid injections may ultimately make tennis elbow worse. For those of us involved in the field of regenerative medicine, this makes sense because steroid injections severely inhibit healing. Surprisingly, platelet-rich plasma (PRP) did not perform well in this study. This may be due to variations in the PRP mixes that are used by different doctors that depend on the type of machine they use to create it. What did work well? Based on this review, various types of prolotherapy treatments may be the most effective. Drawing on my own clinical experience, steroid injections produce short term relief, at best, and then pain returns with greater severity; prolotherapy and our own type of PRP procedure known as Super Concentrated Platelets (Regenexx-SCP) have yielded the most positive results for me.

Knee Steroid Shot Side Effects
As previously stated, a steroid injection in the knee is not the best option available to you. These powerful anti-inflammatory injections, combined with a local anesthetic (the worst of which being bupivicaine), will kill your cartilage cells. Is there another way? We have often advocated the use of biologic injections such as PRP, which has been shown to be more effective than the older biologic alternative, hyaluronic acid lubricating gel. We are also advocates for other, more powerful biologics such as stem cells. If you end up at our clinic for a biologic injection at some later date, our treatment will be much more successful if you have not had local anesthetics and steroid injection because you will be left with less damaged cartilage cells.

Spinal Cortisone Steroid Injections
Evidence Mounts that Steroid Epidural Injections Have Significant Side Effects
In 2013, there have been a horrible several months for epidural steroid injections. There have been several studies showing significant bone loss due to the high dose steroids, others showing a stark increase in bone osteonecrosis with oral steroids, used as well as the NECC compounding tragedy. Just when you thought it couldn’t get any worse, a new study was just published that shows the extent of the whole body side effects that can be caused by steroid epidurals. The study demonstrated that the epidural
steroids suppressed the brain loop that allows you to normally respond to stress and inflammation (hypothalamus-pituitary-adrenal (HPA) axis) for as much as three weeks after a single shot! This is really concerning as these injections are commonly used every week for three weeks. Suppression of this brain function negatively impacts the body’s energy reserves, ability to handle stress, as well as it’s ability to regulate the hormonal and nervous systems. It can also have profound impacts on modulating immune function. Particularly with chronic (long term) stress, suppression of these interconnected functions can lead to compromised health and disease, and greater susceptibility to illness. The upshot? More reasons to avoid steroid epidural injections!

**Epidural Steroid Injection Risks: American Academy of Orthopedic Surgeons (AAOS) Report**

Epidural steroid injection risks are a fact that can no longer be ignored. While they are potent anti-inflammatories, they also have a serious side effect profile. In one study, epidural steroids were associated with an increased fracture risk in middle-aged women and older. The AAOS has reported on the publication of a large dataset that compared thousands of patients who had epidural steroid injections to thousands who did not. The conclusion was the same; the injections are associated with an increase in fracture risk and loss of bone in these groups. Is there any alternative? Yes, there is. The Regenexx™ PL-Disc procedure substitutes your body’s own growth factors for high dose epidural steroids. We have helped approximately 1,000 patients avoid high dose epidural steroid injection risks!

**Epidurals Steroid Shots Increase Fracture Risk in One Study**

Epidural steroid side effects have been in the news because of serious issues with some compounded steroid medications. In addition, the drug maker of the most commonly used high dose steroid in epidurals has stated that their drug shouldn’t be used this way. Just how safe are epidural steroids shots when steroids are injected into the space around the spinal cord? A study presented at the recent meeting of the North American Spine Society, raised new concerns about the steroids that are used to treat millions of back pain sufferers. This is because this study showed an association between the shots and a higher risk for bone fractures.

Researchers looked at data on 6,000 patients treated for back pain. They treated half of the patients with at least one epidural steroid shot and the other half never received this treatment. According to their analysis, spinal fracture risk increased by 29% with each steroid shot. Steroid treatments, such as those taken orally or by IV, have long been linked to bone loss or even more serious diseases like osteonecrosis. However, epidural steroid shots were thought to have little impact on bones because they were delivered directly to the problem area and it was thought they would have less effect on the rest of the body. This study would argue that the high doses of steroids commonly used do get into the body and produce negative effects. The upshot? If you need an injection to calm down an irritated spinal nerve, consider using the growth factors from your own blood platelets rather than high dose steroids.
Epidural Steroid Complications: Abnormal Vaginal Bleeding 3X More Likely

Are there any new, recently discovered complications associated with epidural steroid use? Yes, there are. I have discussed that epidural steroids have a high concentration of anti-inflammatory steroids. How much exactly? I describe it to patients like this - if the height of a matchbook represents the amount of steroids that your body naturally produces then the Empire State Building represents the amount in a traditional epidural steroid injection. Complications from epidural steroid injections in women have been widely reported over the past few months with a 29% increase in fracture risk per injection. This is likely happening because each injections has a massive amount of steroid medication that inhibits bone stem cells from maintaining bone, likely affecting a significant percentage of them with each injection. A similar mechanism might also explain why we see such a significant increase in bone diseases, such as avascular necrosis, when patients are placed on any steroid regiment. Now, a study shows that women who receive epidural steroid injections have a 280% increased risk of vaginal bleeding after the procedure. Why? The dose levels of steroids are too high for the body, so they end up disrupting the levels of the natural hormones that control the onset of a woman’s menstrual cycle. Epidural steroids are also powerful enough to throw off the normal stress hormone axis for a few weeks. A 2009 and 2012 study showed that these injections also disrupt blood sugar control in diabetics. Epidural steroids can have significant effects on the body and we are only now just beginning to understand these effects.

Is there a better way?

Yes, there is a better way. First, for injections into joints, we have all but abandoned the use of milligram dose steroids. Instead, our experience with culturing mesenchymal stem cells has taught us that the body responds much better to 1,000,000 times less steroid. So, rather than milligram doses, we use a million times lower dose of nanograms. In these dose ranges, lab research has shown a net positive to stem cell health rather than a net negative. As noted above, high dose steroids in the epidural space (the most common form of non-surgical injection treatment for a disc bulge or herniation causing sciatica), can have more wide-reaching, negative effects on the body. As a result, we offer patients the option of using the growth factors from their own platelets in the Regenexx™ PL-Disc procedure.
The Problems with Cortisone Injections

Regenexx-PL Procedure

Can the Regenexx-PL procedure replace steroid epidurals?

What is an Epidural?

An epidural is an injection that should be performed under imaging guidance. It places medication or biologics around the nerves in the spine that may be irritated or otherwise inflamed by a bulging or herniated spinal disc. These shots can often help patients avoid spinal surgery. However, they commonly used steroid, which can reduce the body’s natural ability to heal.

Why should I care? The steroids used in most epidural shots are a real problem. While they are very powerful anti-inflammatories, they also can cause severe side effects and dramatically reduce the body’s natural ability to heal itself. As a result, we developed and pioneered using platelet lysate instead of high dose steroids. These natural growth factors from the patient’s own body that are derived from blood platelets can help a patient avoid surgery.

The Regenexx-PL procedure removes the concentrated healing growth factors from platelets and makes them immediately available to cells.
### Regenexx-PL Procedure

<table>
<thead>
<tr>
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<th>Steroid Epidural</th>
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<tr>
<td>Number of Patients</td>
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<tr>
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<tr>
<td>Average time to Cross-over</td>
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What does all of this mean? The top table illustrates registry data collected on 147 patients who received the Regenexx PL-Disc procedure versus 85 who had traditional steroid epidurals. The most interesting statistic is that 11 patients of the 85 needed to switch from steroid epidurals to the Regenexx PL-Disc procedure, while no patients switched from the PL procedure to steroids. The graph below measures the improvement in the Functional Rating Index (FRI) which measures things like pain as well as the ability to walk, sit, lift, bend, etc... Note that steroid epidural patients at 3 months and 6 months post procedure have less improvement in function than patients who received the Regenexx-PL-Disc procedure. Note that this is registry data, so it was collected as patients were treated and that data is not from a more formal randomized study.

**Caution!** This is registry data, which is not the same as a controlled trial. This means it was collected as patients were treated.

### FRI Score Improvement from Baseline

- **3 month - Average FRI Δ:**
  - Steroid Epidural
  - Regenexx PL-Disc

- **6 month - Average FRI Δ:**
  - Steroid Epidural
  - Regenexx PL-Disc

Details: n=60 for patients responding after PL procedure at 3 months and n=48 at 6 months. N=24 at 3 months for steroid epidural patients and n=19 at 6 months.

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Appendix

Should You Get a Steroid Epidural Injection?

Should you get a Steroid Epidural Injection? I’ve blogged many times about the problems with high dose steroids. Above is the new animation we created to help patients better understand the risks associated with steroid epidurals and the advantages of using your body’s own natural growth factors instead!

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