SOUTHEASTERN NEUROSURGICAL SPECIALISTS

Pre & Post op Instructions for **POSTERIOR CERVICAL SURGERY/FUSION**

Please read these instructions carefully. This document will not only review the preoperative instructions, but also address a lot of questions you may have about your post-operative course. Your significant other or your caretaker should also read these instructions. Understanding what to expect after surgery, what is normal and what is not, will help alleviate any fears or concerns. This document is specific for patients undergoing any kind of posterior cervical procedure, but some variation may exist in your specific case and will be discussed at your pre-op appointment. Specifically, if you are undergoing a combined anterior and posterior cervical procedure you should receive instructions regarding the anterior cervical approach also.

PRE-OPERATIVE INSTRUCTIONS:

Your admission will be registered with the hospital by our office. We will contact your insurance company for pre-certification requirements. You will be responsible for inquiring whether a second surgical opinion is required by your insurance. If you have any questions regarding insurance pre-certification, please contact our office.

You will be given Hibiclens solution to use to wash the skin where we plan to make your incision. For your particular surgery this will be the back of your neck from the base of the skull to your shoulder blades.

Use the Hibiclens solution on a washrag or scrubby and wash the area gently for about 5 minutes. Then rinse thoroughly. If you are not given this at the preadmission testing area, it can be purchased at most any pharmacy.

The evening before your surgery, DO NOT EAT OR DRINK ANYTHING AFTER MIDNIGHT. This includes gum, mints and your morning coffee. The anesthesiologist will not administer anesthesia if you have had anything by mouth after midnight, and your surgery will have to be postponed.

If you are on any medications, please check with the anesthesiologist to see whether or not you should take them on the morning of surgery. In general, you will be able to take all medications except some diabetes medicines, some blood pressure medicines and all blood thinners. If you are on any blood thinners or steroids, please contact our office. Unless otherwise instructed, you should stop using any anti-inflammatory medications such as NSAIDS (Ibuprofen, Motrin, Advil, Naprosyn, Celebrex, Meloxicam, Diclofenac, Mobic, etc.), any product containing aspirin, and any herbal supplements (such as: St. John's Wort, fish oil or other sources of Omega -3 fats, Vitamin E, etc.), 7 days before your surgery. These substances can cause bleeding problems and serious anesthetic reactions. Steroids must be discontinued in tapering doses. If your cardiologist or neurologist requires you to take aspirin this may be able to be continued before surgery, and in most cases can be resumed immediately after surgery. Please discuss all your medications with Dr. Khajavi's office.

You should consider stocking up on groceries, including easy-to-prepare meals before you are admitted, so that your return home will be as smooth as possible.

PLEASE REMEMBER: It is important for you to be prepared for your discharge so that non-medical issues (like a ride home or someone at home to care for you) do not delay your discharge from the hospital. You will be

discharged when the doctor feels you are medically stable, not when it may be convenient. Plan ahead to avoid any problems!

THE DAY OF SURGERY:

Please bring the following items with you to the hospital:
- your insurance card or information
- a list of your medications and dosages
- a list of allergies
- any paperwork given to you by the hospital
- a living will, if you have one prepared (you may prepare one at the hospital if you wish)
- Photo ID
- Comfortable clothes to wear home
- Any discs containing X-rays, CT's, or MRI's that you have not turned into the office

Important note: If our office gives you a time to arrive at the hospital, and the hospital gives you a different time, please go with the time given to you by our office. It is best to show up early, since schedule changes can occur due to emergencies or medical issues that may arise with other patients. Although you may be told that your surgery is at a specific time, keep in mind that that unless you are the first case of the day, the time you are given for your surgery is just an estimate. The actual time of surgery will depend how much time it takes to complete the cases before you.

Upon arrival to the hospital you will be given a hospital gown to change into. Do not wear or bring jewelry. Do not wear make-up. Do not wear dark fingernail polish. You will be asked to remove dentures and contact lenses before surgery. If you were given a brace before surgery, do not bring it to surgery, leave it with your family member to be given to you right after surgery. You will be discharged from the hospital when you are medically stable to go home or to a rehabilitation facility. It is important for you to be prepared for your discharge so that non-medical issues (like a ride home or someone at home to care for you) do not delay your discharge from the hospital. Please note that in this time of Covid-19 pandemic spikes, family members may not be allowed to visit you if you are admitted to the hospital.

Therapy/Rehab:

While in the hospital you will be evaluated by physical therapy and/or occupational therapy. They will make recommendations on assistive devices such as walkers, canes and bedside commodes. They will also make recommendations on rehabilitation requirements if needed such as inpatient rehabilitation, home rehabilitation or outpatient rehabilitation.

POST-OPERATIVE INSTRUCTIONS:

You will likely receive general discharge instructions from the hospital when you are discharged. If there is any discrepancy between those instructions and our instructions below, please default to our instructions.

After you are discharged from the hospital you will need to call our office to set up your first post-op appointment, if this was not already done pre-op. This will typically be 10-14 days after surgery. Please keep in mind that the initial postoperative visit is generally set up as a telemedicine visit, but if you have staples or sutures that need to be removed, or if you are told you need x-rays, then you'll need to come to the office for that visit. The first postoperative visit is generally set up as telemedicine visit, primarily as a convenience for patients, but you are always welcome to come in and see us in person.

MEDICATIONS:

You will be given a prescription for an opioid (narcotic) pain medication like Norco (hydrocodone /acetaminophen) or Percocet (oxycodone/acetaminophen). You may also receive a muscle relaxer (like Robaxin or Tizanidine), and a nerve pain medication like Neurontin (gabapentin) or Lyrica (pregabalin), prior to discharge. If you are taking medications other than those prescribed by Dr. Khajavi, you should discuss possible drug interactions with your pharmacist or primary care physician.

Opioid pain medication should only be taken when you have pain, and muscle relaxers should only be taken when you have muscle spasm. Nerve pain medication should be taken exactly as directed (usually 2 or 3x/day), and should never be abruptly stopped, but rather should be weaned off slowly based on Dr. Khajavi's recommendations.

Prescriptions are called in and refilled during office hours only (Mon-Thurs 8am - 4:30 pm, Fri 8am - noon), and you can expect a 24 to 48 hour turn-around time for prescription refills. Do not wait until the last minute to request medications. It is your responsibility to keep up with your medication needs. Due to FDA/DEA regulations, we are unable to call in any opioids and most other controlled substances. Opioids require a signed script from a physician and generally must be picked up from our office in person, although the process of being able to electronically prescribe them may be an option.

You should begin tapering off the pain medications within 2-4 weeks of your discharge. As soon as you are comfortable, take a nonprescription pain medication (i.e. Tylenol) for pain relief. Please keep in mind that the maximum amount of Tylenol (acetaminophen) that you can take in a 24-hour period is 4000 mg, and that there is usually already some Tylenol in the opioid pain medication you are given. **Do not take any nonsteroidal anti-inflammatories (NSAIDs)** such as Ibuprofen (Motrin/Advil), Naprosyn (Aleve), Meloxicam, Diclofenac, Celebrex, etc. for 6 months, as these can interfere with the fusion process. Resume medications you were taking for other pre-existing medical conditions before you came into the hospital, unless otherwise advised by Dr. Khajavi. Do not resume blood thinners until cleared by Dr. Khajavi, usually 7-14 days after surgery. There are also over-the-counter medications that can thin your blood, such as fish oil, vitamin E, and omega-3 fatty acids among others, and these medications should not be restarted until one week after surgery. The one exception to this rule is baby aspirin. If you have a heart condition Dr. Khajavi may recommend that you continue daily baby aspirin before and after surgery without missing any doses. Please discuss this with Dr. Khajavi and/or his assistants.

Constipation is a common side effect of opioid pain medication and surgery. You should use an over-the-counter stool softener, drink plenty of fluids, and walk as much as possible. The benefit of walking cannot be overstated. If you do become constipated, you should try Milk of Magnesia, a Fleet's enema, a rectal suppository, or if necessary, Magnesium Citrate (if available, this was recently move to the market concerns about contamination). These are available over the counter at most pharmacies. Please notify the office if your constipation becomes severe.

DRESSING/WOUND CARE:

Your incision may or may not be covered by a dressing. We sometimes use a liquid surgical adhesive to seal the wound after closure instead of sutures or staples. If your incision was closed with a liquid surgical adhesive you may shower immediately after surgery. If there is a dressing over the glued incision you may remove it as soon as you get home.

If you have staples or sutures and a gauze dressing instead of a liquid surgical adhesive, the dressing may be removed 2 days after surgery. There is no need to reapply another dressing or use any special ointment. If there is some slight drainage for a few days after the dressing is removed, then apply clean 4 x 4 gauze with a few pieces of tape until the drainage stops. If you are wearing a hard cervical collar, you may want to apply a loose 4x4 gauze dressing with 1-2 pieces of tape, just to keep the collar from irritating the incision. Do you not take a shower until the third day after surgery, or if there is any wound drainage, you may shower two days after the wound drainage has stopped. Staples will be removed in about 10-15 days post op at your first postoperative appointment.

When showering, you can use whatever products you normally use. There are no special requirements, except you cannot take a bath or go in a pool for 1 month after surgery.

Finally, if you were told that there was a durotomy at the time of surgery, there are specific instructions regarding bedrest, sitting limitations, and wound drainage precautions which will be given to you at the time of discharge.

PREVENTION OF PNEUMONIA AND BLOOD CLOTS IN THE LEGS:

Pneumonia can occur after surgery when patients do not take big, deep breaths, and from inactivity (sitting too long or even worse, laying down too much). Blood clots (DVT) can also occur after surgery and inactivity plays a major role in their formation. A blood clot in your leg can cause pain and swelling in the affected leg (calf usually), and if it breaks off, can travel to your lungs (PE) and be fatal. Using the incentive spirometer you received in the hospital frequently helps prevent pneumonia but walking as much as possible helps prevent both pneumonia and DVT/PE.

WHAT TO EXPECT AFTER SURGERY:

It is normal for your incision to be sensitive for a few days and for a little redness to occur. A small amount of drainage it's also not uncommon, even if the incision is glued closed. The drainage is usually yellowish or pinkish color, and if it occurs you should just put a sterile 4 x 4 gauze on the incision with a couple pieces of tape. Change the dressing once a day until the drainage stops, which will usually be in a few days. If you notice any excessive redness, swelling, or warmth around the incision, or the drainage is excessive, or appears purulent (pus like), then please call the office. Some bruising around the incision is not uncommon and will improve with time.

It is normal to run a low-grade fever after surgery and is usually due to atelectasis. Atelectasis is when very small areas of the lung are not fully inflated, which causes the temperature. Reasons for atelectasis include not taking enough deep breaths and not walking enough. This can be prevented by performing the deep breathing exercises using the incentive spirometer you were given in the hospital and increasing your activity. You should use the incentive spirometer 15-20 times/hour while you are awake. Several (4-6) short walks a day are encouraged. If you have a fever over 102 or chills, please call the office.

The goal of the surgery may be to take the pressure off the nerves to improve your lower extremity pain, and/or to fuse the spine (to improve your low back pain, stabilize your spine, and/or to prevent future disc herniations at the involved level). Numbness is usually the last symptom to resolve and can take several weeks. In general, most of your leg pain should resolve over a period of 4-6 weeks. In some patients there can be temporary or delayed leg pain, which is why we prescribe the nerve pain medications (Neurontin or Lyrica). Some back pain is expected after this type of procedure. Treat your pain with the medications prescribed. You can also use ice or heat (do not place directly on the incision) for 10 minutes four times a day. DO NOT SLEEP ON A HEATING PAD. In general, most of your pain should improve over a period of 4-6 weeks. Finally, we generally inject a medication called Exparel around the incision, which is a long-acting numbing medicine like the Novocain you get at the

dentist's office. It does not eliminate the incisional pain but reduces it for 3-4 days. Consequently, if 3-4 days after surgery you feel a little bit more pain around your incision, that is quite normal.

Although the nerve or spinal cord compression has been corrected with surgery, it will take time for the nerves, muscle, and tissues around the area of the incision to heal. Therefore, you may experience symptoms very similar to your pre-operative conditions. These symptoms can sometimes worsen temporarily and occasionally symptoms do not improve at all due to permanent damage to the spinal nerves.

If the surgery that you are having is to correct, a spinal deformity, this requires us to move the vertebra back into a more normal alignment. We believe it is imperative for a good long-term outcome to try to restore the alignment of the spine to as normal and anatomic alignment as possible, but as the spine moves, so do the nerve roots. Occasionally, because of this movement, the nerves can get stretched, and you may experience a new or recurrent arm pain in a delayed fashion after surgery, typically 3 to 5 days after surgery. This is particularly common with large corrections or in patients that have had previous surgery, as the nerves tend to have some scar tissue. These symptoms are almost always transient and will be managed with increase in gabapentin or Lyrica dose and short-term steroids.

As discussed prior to surgery, the purpose of the operation is often to prevent worsening of neurologic symptoms. If you had arm pain before surgery, this generally improves after surgery, but not always. Arm pain may persist after surgery due to the nerve damage done to the previously compressed nerve roots. If your upper extremity pain improves after surgery, it is not uncommon to occasionally feel a little reminder of the pain from time to time. This too is nothing to be too worried about, as this also often occurs without serious clinical meaning. Again, if symptoms persist, call the office and we will make an appointment to see you prior to your scheduled follow up visit.

If you had myelopathy (symptoms caused by damage to the spinal cord), these symptoms may not improve immediately after surgery, and in some cases may even worsen after surgery. This neurological worsening is usually temporary but in rare cases may be permanent.

In many cases you may be given a hard collar and instructed to wear it for up to 3 months or more after surgery. The hard collar helps the surgical area fuse. The hard collar should be worn at all times, including when showering. When temporarily removing the hard collar, remember to avoid moving your neck as much as possible. Try to turn with your body, not with your neck. You may also be required to wear the hard collar when sleeping. The nurses or therapists will review putting on and off your hard collar before discharge so that you are comfortable doing it and to assure that the fit is comfortable. The fit should be snug to prevent movement of your head. If a rash develops under the collar, dry the area and place a cloth between the collar and the skin). If you have any concerns with the fit of the hard collar, or if irritation of the skin develops, call our office. If you are at high risk for not fusing after surgery ("pseudarthrosis") you may be prescribed a bone stimulator, which helps the bones fuse and you will need to use every day for 9 to 12 months.

It is not uncommon for patients after surgery to feel tired or have a lack of energy. There are several reasons for this, including medication side effects, alteration in sleep cycle, and change in activity level. The best way to combat this is to go for plenty of short walks (preferably outside), minimize the amount of opioid medication taken, and to try not to take naps during the day (so that nighttime sleep is better), and staying involved socially with friends and family. Returning to work is also very helpful, although the timing of that will depend on your surgery any type of work you do. Finally, some patients, particularly older patients, may experience some confusion or memory problems after surgery. This too is usually related to some of the previously mentioned factors that affect energy level. The confusion is usually worse in the hospital and often worse at nighttime but should improve with time. Contrary to popular belief, surgery and anesthesia do not cause dementia/Alzheimer's, so if the patient's confusion or memory problems do not improve, there may have been some unrecognized memory deficits prior to surgery, and consultation with Neurology should be considered.

RETURN TO DAILY ACTIVITIES:

For the first couple of weeks following surgery, you will need to rest and do as little activity as possible, other than walking as much as possible. As previously mentioned, you may feel sore and stiff. By the third week, however, you should begin to feel less pain and stiffness. During your second post op week, you should be able to take more walks, go out to eat, or go shopping. We would advise you not to walk on the treadmill for the first 1-3 months after surgery and not to walk the dog, as these activities could lead to unintended falls. Do not do any strenuous activities including heavy lifting, pushing, or pulling. Gradually, over the next couple of weeks you will be able to progressively increase your activities. Use the following as a guideline:

1. Driving. You should not drive for 1-2 weeks after surgery, but this may vary. You may drive sooner if you are not taking opioid pain medication. *You cannot drive if you are wearing a hard cervical collar*. You may ride in a car on short trips. It can be more comfortable for you to recline your seat back when traveling long distances. You should not plan to travel for long distances for at least a month after surgery.

2. Working. If you have a manual labor type job, you should not plan to return to work for 12 weeks or more following surgery if you had a fusion. If you have a predominantly sedentary job, you can plan to return to work in a part-time capacity after 2-4 weeks. At your one month return office visit, Dr. Khajavi will assess you and determine at what point you may return to work. If you had a minor posterior cervical procedure like a laminoforaminotomy, and have a manual labor type job, you should not plan to return to work for 4-6 weeks or more following surgery. If you have a predominantly sedentary job, you can plan to return to work in a part-time capacity after 2-4 weeks. Caution and common sense should be used to determine whether or not you should engage in any activity.

3. Activity. No lifting, pulling, or pushing objects over than 15 pounds. (Examples: infants, grocery bags, vacuum cleaners, lawn mowers, etc.). Avoid neck-strengthening exercises during this 12 week recovery period. The worst position for your neck is extension (looking up to the sky) and flexion (chin on chest). You may climb stairs at any time but use the handrails. It may be advisable to have someone with you the first few times. Remember to maintain good posture. Rest between activities, as you may find that you tire more easily after surgery. This is to be expected, and it may take some time before your energy level returns to normal. You should abstain from sexual activity for at least 2-4 weeks following surgery. Sexual relations are permissible after this period but should not be too vigorous. Use your judgment. Remember: the above lengths of time for sitting and walking will vary with each patient.

4. Exercising. Resuming exercise should be done carefully. Walking is one of the best exercises to improve your overall fitness and endurance level. Start with a few small trips a day and gradually increase the distance according to your tolerance. Don't try to do too much too soon! Do not participate in any aerobic type activity (including tennis and golf) or contact sports for three months following surgery. Formal physical therapy for rehabilitation of your neck will not begin until 12 weeks after surgery.

5. Your first follow up appointment is generally the only appointment you will have without x-rays. All subsequent follow up appointments will require x-rays: 4-6 weeks, 12 weeks, 6 months (for some), and 1 year post op if you had a fusion. Please make sure your x-rays have been ordered PRIOR to your follow up appointment.

Do not smoke! Remember, smoking is the enemy of fusion!

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The following is for those patients that had a posterior cervical fusion:

Recovery Phase: First 3 months post op

By the time the first month has passed, the surgical or incisional pain for most patients has diminished significantly. Since most of the fusion is taking place during these first 3-4 months, it's imperative to avoid bending or twisting the neck, or doing strenuous activity, which are activities that can cause the hardware to come loose or break. During this time, you will be wearing a neck brace. Lack of normal activity and wearing the brace can all lead to some stiffness, neck muscle tightness, and weakness or deconditioning of the neck muscles. This is why patients often complain that although their pre-op arm pain is better, they have a different kind of neck pain, which they describe as "achy", "sore", and "tired". Patients often say they are stiff when they first get up in the morning, get better after an hour or so, but by the end of the day, or after too much activity, their neck is sore and they need to lay down. This is quite typical for patients who have been wearing a neck brace, and much less common for those that were not prescribed a brace.

To some extent this is the price to pay to keep the spine immobile and promote fusion, and post op physical therapy prescribed 3-4 months after surgery will help rehabilitate those muscles. To reduce the amount of pain, stiffness, and soreness during this time, periodically remove the brace when you are sitting still in a good chair. Remember the brace is meant to keep you from twisting or bending your neck, but if you're sitting still, then you don't really need the brace. Doing this will allow your neck muscles to be activated. But remember you must be still during these times.

Rehabilitation Phase: 3-6 months post op

At the end of the first 3 months, we will get some x-rays to confirm that you are fused. You will continue to fuse (lay down more bone) for 2 years, but more than half the fusion is completed by now, so the brace is no longer needed, nor are all the restrictions you had during those first 3 months. But you can't go from lots of restrictions to doing any activity you want in one day. This is what the next 3 months is for, the rehabilitation phase. At this time we will ask you to:

1. Wean the brace off gradually over about 7-10 days. Given there is some muscle deconditioning, taking the brace off too fast may result in some neck pain or spasm. By wearing it less and less each day, you give your muscles some time to accommodate.

2. We will get you started in post op physical therapy. This is extremely important and is very different from the therapy you may have had before surgery. They will work with you to get the nerves sliding or gliding (reduce risk of scar formation on the nerves), work to reduce your stiffness, strengthen your neck muscles, teach you about proper body mechanics and posture, and much more. During the initial 2-3 weeks of rehab you may experience a slight increase in the achiness or soreness of your neck, but as your muscles get stronger, that should subside. When you are done with physical therapy, you must make sure to get a home exercise program for your neck, to do every day. This will help reduce the risk of needed additional spine surgery in the future.

3. After a month of therapy, you can begin to gradually return to the activities you enjoy, but go slowly, using pain as your guide, and seeking the advice of your physical therapist.

Your next follow up with us is usually at the 1 year anniversary of your surgery, with a final set of x-rays, although for some patients with more complex surgeries, a visit 6 months post op is recommended.

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PLEASE NOTE: CONDITIONS WILL VARY BETWEEN INDIVIDUAL PATIENTS. IT IS VERY IMPORTANT TO DISCUSS YOUR PARTICULAR SYMPTOMS WITH DR KHAJAVI OR HIS MEDICAL STAFF. THIS INFORMATION SHOULD BE USED AS A GENERAL INFORMATION SHEET ONLY AND SHOULD NOT BE USED IN LIEU OF MEDICAL TREATMENT. THE POST-OPERATIVE INSTRUCTIONS LISTED ABOVE ARE GUIDELINES. DR. KHAJAVI MAY HAVE SPECIFIC DO'S AND DON'TS IN YOUR CASE.

Disclosure / Conflict of Interest Statement:

Collaboration between surgeons and medical device industry has contributed to important advances in spinal surgery. However, some of the collaborations can create situations in which the care of the patient is affected. Dr. Khajavi has served as a consultant for NuVasive, a spinal instrumentation company, since 2004. As one of the earliest surgeons to perform minimally invasive lateral lumbar fusion surgery, Dr. Khajavi receives compensation for activities directly related to teaching and sharing of his experience / results, including reimbursement for travel expenses, meeting registration fees, and a fair honorarium if applicable. Dr. Khajavi also receives payment and/or royalties for product development activities. Dr. Khajavi occasionally receives compensation for certain clinical research projects, but the vast majority of his clinical research receives no compensation or funding. All compensation is at fair market value, and accurately reflects Dr. Khajavi's time, effort, and expertise committed to the activity.

Dr. Khajavi staunchly believes that the patient's interests always come first, and his recommendation regarding surgery is never influenced by his relationship with medical industry. Dr. Khajavi feels patients need to understand a surgeon's exact relationship with medical industry, and to determine whether any conflict of interest exists. Dr. Khajavi welcomes any questions or conversations regarding your specific surgery and the instrumentation utilized.

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