



Post-Operative Protocols for Lumbar TDR

A Summary of Commonly Prescribed Protocols from Textbooks and Journal Publications

The following is a brief compendium of commonly prescribed protocols sourced from articles and textbook chapters on the subject of postoperative care of the LTDR patient. Also included are common post-operative instruction given by a sampling of experienced M6-L surgeons. Key aspects of post-operative care surveyed include:

1. Early Ambulation
2. Use of a Corset or Brace
3. Steps to Return to Normal Activity
4. Return to Work

Since the following references were derived from multiple authors with varying opinions, there are differences in these protocols. However, two common and important aspects of the post-operative protocols **emphasize sufficient healing time and a gradual return to normal activity to allow for good device-to-bone incorporation.**

Commonly Prescribed Protocols

1. Early Ambulation

There is general agreement in the literature that patients undergoing LTDR will benefit from standing and walking as soon as possible following surgery^{1,3,4b,4c}.

2. Use of Corset or Brace

There are some varying opinions on the use of bracing; some surgeons believe bracing is not necessary, while others may prescribe bracing as needed for patient comfort.

References:

- No bracing^{3,4b}
- 2 weeks post op (ProDisc)^{3,4a}
- 3 months post op (Charité)³
- As needed for patient comfort^{4c}



3. Steps to Return to Normal Activity

Daily walking as tolerated is recommended in all reviewed articles. Following are more specific recommendations and references regarding physical activity:

References:

- *Limited physical activity*
 - *Restricted from vigorous physical activity for 2 weeks to prevent incisional hernia*^{4c}
 - *No recreational sports for 6 weeks*^{4a}
 - *No golf, tennis, other impact-loading activity for 6 weeks*^{4c}
 - *Avoid hyperflexion, heavy lifting, impact loading, twisting for 3 months*³
 - *Limit extension for 3 months*²
 - *No running, jumping, contact sports for 3 months*³
- *Time points to more vigorous activity*
 - *Cycling on a stationary bicycle, longer and faster walks, more vigorous isometric exercises, and hamstring and hip stretching exercises are encouraged after removal of stitches at 12 days after the operation*^{4b}
 - *Swimming after 4 weeks*³
 - *Return to recreational sports at 6 weeks*^{4a}
 - *Impact sports allowed at 4 months*^{4b}
 - *Unlimited cardio and light weight training (25-50% of pre-op normals) at 6 weeks*¹
(note: no bent-over rows, squats or military presses)
 - *Lumbar spine rotation, side bending and abdominal strengthening at 6 weeks*³

4. Return to Work

The articles reviewed suggest return to work as soon as comfortable, within one week, if tolerated^{4a,4c}.

Common Protocols Among Surgeons Implanting the M6-L

A Spinal Kinetics survey of experienced surgeons implanting the M6-L revealed the following key post-operative recommendations:

- Early ambulation was very important. Get the patient up, sitting and standing the day of the surgery if possible. Some careful and limited walking was also recommended.
- Use of a corset or brace for up to 10 days was recommended by about a third of respondents.
- Return to work averaged 4-6 weeks but could be up to 12 weeks depending on the physical demands of the job.
- Physical Therapy should start right after surgery and continue through about 6 weeks. A gradual progression of Nordic walking exercises and limited weight exercises (max. 10 kg) were typically prescribed starting around the 3rd day post-op. Full sports activities were not recommended until after 12 weeks.



Conclusion

Management of the postoperative patient following LTDR varies somewhat among surgeons. It is up to each surgeon performing LTDR to base their own postoperative care on their own knowledge and experience of the device, surgical procedure and patient characteristics. However, one goal remains constant across all authors, devices and M6-L users referenced in this Bulletin: **sufficient healing time and limited activity to allow for good device-to-bone incorporation.** The M6-L, by virtue of its inherent physiologic stiffness, may warrant staying more toward the conservative side of the protocol variance compared to cases using discs that offer no mechanical restraint.

References

1. **Neurosurg Focus 28 (5):E18, 2010**
Arthroplasty in the military: a preliminary experience with ProDisc-C and ProDisc-L. L.M. Tumialan, R. P. Ponton, A. Garvin, and W. Gluf.
Department of Neurosurgery, Naval Medical Center San Diego, California

TABLE 3: Algorithms for Returning Treated Individuals to Active Duty

Treatment Group and Postop Time (Wks)	Activity
ProDisc-C	
0-3	Begin nonimpact cardio exercise up to 60 mins daily; LifeCycle, StairMaster, elliptical and walking are recommended
3-6	Begin nonimpact cardio without limitations; begin light weight training at 25-50% of pre-op capacity
7-12	Begin impact cardio, including running on treadmill; progress to unlimited cardio by Week 12; advance to full weight training Wks 7-12 in a progressive fashion; cleared to return to dive/parachute duty/deployments
ProDisc-L	
0-3	Begin walking as tolerated
3-6	Begin nonimpact cardio; may progress to 60 mins/day
6-10	Begin unlimited cardio; light weight training may begin at maximum of 25-50% of pre-op capacity; no bent-over rows, squats or military press
11-12	Increase weights and cardio up to 75% of maximum
13-16	Continue to increase weight lifting up to full tolerance & cardio (nonimpact)
17-20	Begin impact cardio including running on treadmill, progress to unlimited cardio by Wk 20; may resume dive operations at 20 wks; jump operations may begin Wk 26



2. Wheelless' Textbook of Orthopaedics: Lumbar Total Disc Replacement. R. D. Guyer, Texas Back Institute

POSTOPERATIVE CARE

LTDR patients can participate in rehabilitation and activities more quickly following surgery than fusion patients (fusion patients need to limit use of their trunk to allow the fusion to incorporate)

Primary restriction following LTDR is limiting extension for the first 3 months to allow bony ingrowth into the metal endplates, otherwise patients can return to normal activities quickly, except for vigorous sports, which are allowed after 3 months

3. Contemporary Neurosurgery, 27(19) 2005. Spinal Artificial Disc Replacement: Lumbar Arthroplasty Part II. A.T. Villavicencio, S. Burneikiene, and J. P. Johnson.

POSTOPERATIVE CARE

Recuperation time after the arthroplasty procedure is comparatively short. In the multi-institutional FDA prospective randomized Charité artificial disc clinical trial, the mean hospitalization time was 3.4 days, and patients were able to return to work in 6 weeks, on average.

Physical therapy begins after the immediate postoperative period. Patients should begin to walk as soon as possible. Rehabilitation begins with abdominal flexion and active and passive hip and knee flexion exercises. After 4 weeks, physical therapy is directed toward maintaining mobility of the affected spinal levels, general conditioning, and strengthening. Lumbar spine rotation, side bending, and abdominal strengthening can begin at 6 weeks.

Some surgeons advocate that patients wear a lumbar corset for 3 months after Charité ADR and for 2 weeks after implantation of the ProDisc. This measure usually is not required after Maverick device implantation, because the Maverick has a large central keel. Patients should avoid lumbar hyperextension, heavy lifting, impact-loading activities, and twisting after implantation of the Charité and should avoid mechanical vibration or shock for about 3 months when the ADR has been performed with the Maverick device. Jumping, running, or contact sports are not recommended for 3 months, but swimming usually can begin after 4 weeks. The patient should be weaned from narcotic medication as early as possible.

4. Motion Preservation Surgery of the Spine: Advanced Techniques and Controversies (Elsevier Inc., 2008)

J. J. Yue, R. Bertagnoli, P.C. McAfee, and H. S. An.

4a. Chapter 39 – ProDisc-L Total Disc Replacement. R. B. Delamarter, B. B. Pradhan

POSTOPERATIVE CARE

A soft back brace can be used for the first week or two to allow for wound protection. Otherwise, there is no extensive postoperative protocol. Patients can return to work as soon as they are comfortable, but they should allow 6 weeks before returning to recreational sports or full duty (if the job is physically demanding).

4b. Chapter 42 – Kineflex

U. R. Hähnle, M. De Villiers, I. R. Weinber



POSTOPERATIVE CARE

Postoperative mobilization: Patients are allowed to ambulate the day after surgery without bracing. Supervised gait training, isometric muscle strengthening, and stretching exercises start from day 1 postoperatively. At discharge (day 2 to 4 postoperatively), patients are instructed to walk every day and are allowed to sit as long as they feel comfortable. Cycling on a stationary bicycle, longer and faster walks, more vigorous isometric exercises, and hamstring and hip stretching exercises are encouraged after removal of stitches at 12 days after the operation. Light sports are allowed at 6 weeks. Impact sports are allowed only at 4 months in order to allow bony incorporation and remodeling at the implant bone interphase.

4c. Chapter 44 – Maverick Total Disc Replacement. M. F. Gornet

POSTOPERATIVE CARE

Patient care following this transperitoneal or retroperitoneal approach is challenging but not unlike the stand-alone anterior fusion procedure. The use of minimally invasive techniques lessens the morbidity, whereas concerns about bowel and bladder issues and incision issues are consistent with experiences after anterior fusion surgery. The use of an abdominal binder after surgery can provide patient comfort while supporting the soft tissue. Posterior and anterior ice packs are recommended to control soreness, in particular during the mobilization process. Patients are encouraged to mobilize less than 24 hours after surgery and begin walking, although diet is restricted to ice chips until normal bowel sounds return. The catheter is removed the morning after surgery, and the patient is typically discharged if free from nausea or vomiting and if walking independently.

Walking is strongly encouraged for TDR patients as soon as tolerated, and they are advised to take the cue from their own incision pain level and to add activity if they are free of pain. To avoid the risks of an incisional hernia, patients are restricted from vigorous physical activity for the first 2 weeks, even though many patients report feeling strong enough to begin more quickly.

Activity levels are increased as tolerated from weeks 2 to 6, whereas golf, tennis, and similar impact-loading activities are discouraged for at least 6 weeks, with patient tolerance and healing of the incision determining the ultimate timetable. Likewise, patients may return to work in as little as 1 week as tolerated.