

Lumbar total disc replacement for treatment of lumbar spondylolisthesis

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Introduction

Lumbar degenerative disc disease is a common problem. It is estimated that degenerative lumbar spondylolisthesis exists in up to 17% of 50-64-year-old age group and 25% of those over age 65.

Spondylolisthesis is often associated with spinal stenosis.

Lumbar total disc replacement has been demonstrated to be effective for treating lumbar degenerative disc disease. Improvements after surgery are rapid and sustained.

There are very little or no reports of total disc replacement for treatment of spondylolisthesis.

Decompression of spinal stenosis is via anterior distractive ligamentotaxis and indirect decompression alone with additional reduction of spondylolisthesis.

Materials and Methods

5-year period from October 2018 to February 2024 with minimum 2 year follow up.

There were a total of 37 patients 9 males 28 females with spondylolisthesis and spinal stenosis treated with lumbar total disc replacement after failed conservative management.

All patients were assessed in terms of back and leg pain Visual Analogue Scale VAS and Oswestry Disability Index ODI at standard time points. Plain radiographs were available pre operatively and post operatively at 2 weeks, 6 weeks, 3 and 6 months, and at one year with yearly x ray thereafter. Pre-operative MRI was available for some patients with post-operative MRI in some.

Patients underwent surgery from either a standard right or left retroperitoneal approach with a single surgeon.

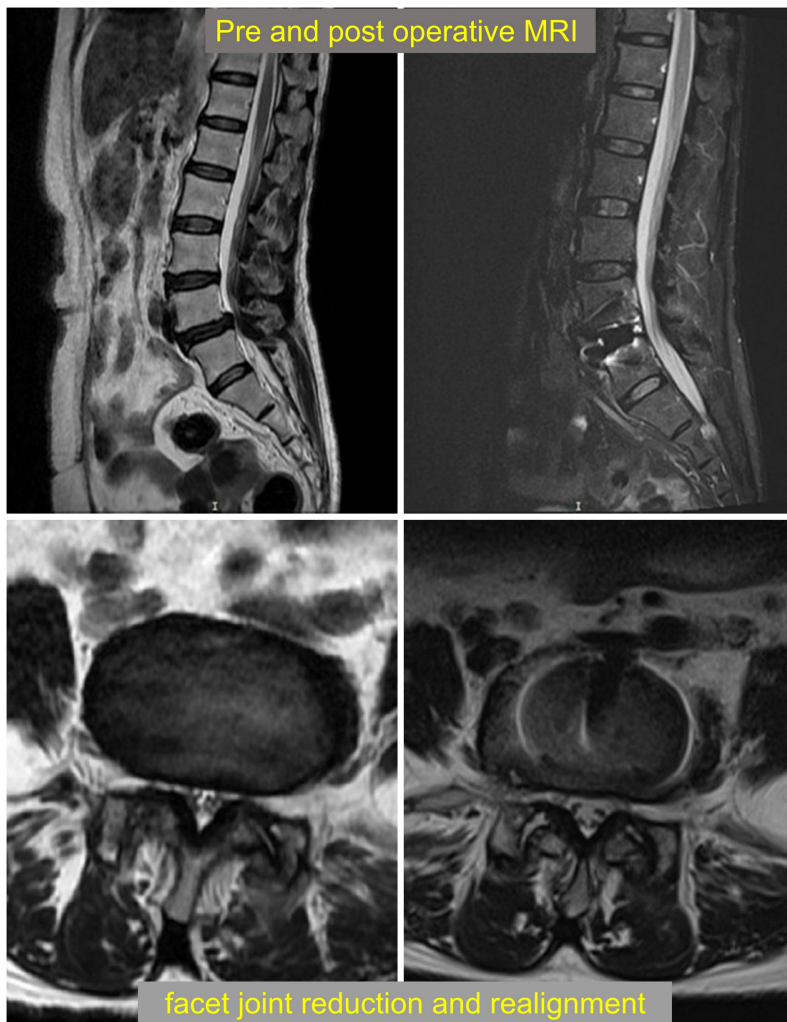
Results

All patients had relief of stenosis symptoms. One female patient developed implant subsidence which required conversion to fusion. Average ODI improvement was from 32.4 to 4.1, VAS pain for back pain from 4.4 to 1.1 leg pain from 7.1 to 0.7. Pre and post-operative MRI for patients with post-operative MRI imaging demonstrated resolution of spinal stenosis and in some instances reduction and healing of facet joint arthropathy. Results for ODI and VAS seemed to stabilize between 6 to 12 months with minimal change thereafter at longer term follow up.

Motion was preserved in the operated segment with no evidence of new adjacent segment disease at last follow up.

Conclusion

Lumbar total disc replacement is a viable option for patients with degenerative lumbar spondylolisthesis. Indirect decompression is achieved via ligamentotaxis and spondylolisthesis is reduced with facet joint arthropathy improving. Compared to spinal fusion, lumbar motion is preserved with maintenance of dynamic lumbar alignment thereby reducing the risk of adjacent segment degeneration.



Pre and post operative MRI with indirect decompression by ligamentotaxis and reduction of facet joint subluxation and restoration of facet joint alignment

No.	Date	Sex / Age	Spondylolisthesis	TDR	VAS back pre	VAS back post	VAS leg pre	VAS leg post	ODI pre	ODI post
1	29 Nov 2018	M/52	L4-S	L4-S L5-S1	5	1	5	0	24	0
2	15 Dec 2018	F/64	L4-S	L4-S	4	1	6	0	26	0
3	13 Feb 2019	F/63	L4-S	L4-S L5-S1	5	3	6	2	36	8
4	15 Jun 2019	F/55	L4-S	L4-S L5-S1	5	1	7	0	34	2
5	6 Mar 2020	F/53	L4-S	L4-S L5-S1	5	1	6	0	30	2
6	25 Mar 2020	F/57	L4-S	L4-S	5	1	6	0	40	4
7	29 Apr 2020	F/58	L3-4	L3-4	4	1	7	1	38	6
8	30 May 2020	F/52	L4-S	L4-S L5-S1	4	1	8	0	34	2
9	16 Sep 2020	F/74	L4-S	L4-S	4	1	6	0	30	6
10	19 Nov 2020	F/64	L4-S	L3-4 L4-S	5	1	7	0	40	4
11	6 Feb 2021	M/55	L4-S	L4-S L5-S1	5	1	7	0	30	8
12	12 Jun 2021	F/59	L4-S	L4-S L5-S1	5	1	7	1	32	6
13	15 Sep 2021	F/78	L4-S	L4-S	3	1	6	1	30	4
14	15 Sep 2021	F/63	L4-S	L4-S	4	2	6	2	30	6
15	18 Sep 2021	M/65	L3-4	L3-4	4	1	7	3	34	4
16	1 Dec 2021	M/70	L2-3	L2-3 L3-4	5	1	6	0	24	4
17	15 Dec 2021	F/73	L3-4	L3-4	3	1	7	1	32	6
18	25 Mar 2022	M/61	L4-S	L4-S L5-S1	3	0	7	1	32	6
19	26 Mar 2022	F/65	L4-S	L4-S	3	1	7	2	30	6
20	25 May 2022	M/61	L4-S	L4-S L5-S1	4	2	7	1	32	6
21	1 Jun 2022	F/70	L4-S	L4-S L5-S1 ALIF	5	2	6	2	34	8
22	25 Jun 2022	M/66	L4-S	L4-S	4	1	7	0	26	2
23	28 Sep 2022	F/63	L4-S	L4-S	4	0	7	0	30	4
24	8 Oct 2022	F/74	L4-S	L4-S L5-S1	3	1	7	1	34	6
25	26 Oct 2022	M/51	L3-4	L3-4 L4-S L5-S1	6	0	7	0	26	0
26	4 Nov 2022	F/67	L4-S	L4-S	4	1	7	0	34	4
27	15 Dec 2022	F/59	L3-4	L3-4 L4-S L5-S1	8	1	9	0	54	6
28	12 Jan 2023	F/67	L4-S	L4-S	4	1	8	0	46	4
29	3 Jun 2023	F/54	L4-S	L4-S	3	0	7	0	30	2
30	14 Jun 2023	F/62	L4-S	L4-S L5-S1	4	0	6	0	38	4
31	26 Aug 2023	M/69	L4-S	L4-S L5-S1	4	1	7	0	34	4
32	21 Oct 2023	F/51	L4-S	L4-S L5-S1	4	0	7	0	28	2
33	20 Dec 2023	F/55	L3-4	L3-4 L4-S L5-S1	8	2	6	1	38	4
34	22 Dec 2023	F/64	L4-S	L4-S	5	2	7	2	42	4
35	26 Jan 2024	F/57	L5-S1	L5-S1	3	1	6	0	28	0
36	27 Jan 2024	F/66	L4-S	L4-S	4	1	7	1	28	8
37	26 Feb 2024	F/73	L3-4 L4-S	L3-4 L4-S L5-S1	5	2	5	0	32	2
		M=9			4.4	1.1	7.1	0.7	32.4	4.1
		F=28								
		Total 37								

Summary of patients with pre operative and post operative outcomes - Leg and back pain VAS, ODI pain at a minimum of 2 years follow up