**SUPPLEMENTAL DIGITAL MATERIAL**

**Table 1. Detailed study demographics, diagnoses, and treatment interventions for studies comparing discectomy vs. corpectomy. vs discectomy-corpectomy hybrid in patients with multi-level CSM.**

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| **Study** | **Study Design** | **Population** | | **Diagnosis (levels)** | | **Treatment** | | **Ancillary stabilization techniques** |
| Multiple discectomies (A) versus single or multiple corpectomies (B) | | | | | | | |  |
| Oh (2009) | Retrospective cohort  F/U time: 26.23 ± 15.0 mos (12-63) range  F/U rate: NR | A | B | A | B | A | B |  |
| N = 31  Mean age: 54.5 ± 11.6 range (28 - 77) years  Sex: 16/31 (51.6%) male | | Two-level: 7/14 (50%)  Three-level: 7/14 (50%) | Two-level: 17/17 (100%) | ACDF with:   * Interbody cage * Anterior cervical locking plate * Segmental fixation | ACCF with:   * Interbody cage * Anterior cervical locking plate | No ancillary stabilization reported |
| n = 14  Mean age: 52.6  Sex: NR  F/U rate: NR  F/U time: 24.9 mos | n = 17  Mean age: 55.1  Sex: NR  F/U rate: NR  F/U time: 27.3 mos |
| Guo (2011) | Retrospective cohort  F/U time: 37 months  F/U rate: NR | N = 120\*  Mean age: 53.5 ± 9.6 years  Sex: 67/120 (56%) male | | Three-level: 43/43 (100%) | Three-level: 24/24 (100%) | ACDF with:   * Interbody cage * Anterior cervical locking plate * Segmental fixation | ACCF with:   * Interbody cage * Anterior cervical locking plate | * Philadelphia collar used for 3 months |
| n = 43  Mean age: 52.7 ± 9.4 years  Sex: 24/43 (56%) male  F/U time: 37.7 ± 7.2 mo | n = 24  Mean age: 55.2 ± 10.1 years  Sex: 13/24 (54%) male  F/U time: 37.3 ± 7.3 mo |

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| Lin (2012) | Retrospective cohort  F/U time: 2 year min.  F/U rate: NR | N = 120  Mean age: 58.3 ± 9.8 (37-78) years  Sex: 81/120 (67.5%) male | | | Three-level: 46/57 (81%)  Four-level: 11/57 (19%) | Three-level: 51/63 (81%)  Four-level: 12/63 (19%) | ACDF with:   * Plating plus cages | ACCF with:   * MC plus plating | * Philadelphia collar used for 6-8 weeks |
| n = 57  Mean age: 58.7 ± 9.7 range (37 – 77) years  Sex: 38/57 (67%) male  F/U rate: NR  F/U time: NR | | n = 63  Mean age: 57.9 ± 10 range (38 – 78) years  Sex: 43/63 (68%) male  F/U rate: NR  F/U time: NR |
| Song (2012) | Retrospective Cohort  F/U time: NR  F/U rate: NR | N = 40 | | | Three-level: 7/25 (28%)  Four-level: 18/25 (72%) | Two-level: 10/15 (67%)  Three-level: 5/15 (33%) | ACDF with:   * Autogenous iliac bone graft with plating: 10/25 * Solis cage: 15/25 | ACCF with:   * Autogenous iliac bone with Halo-vest: 12/15 * Autogenous fibular bone graft with Halo-vest: 3/15 | * All ACDF received Philadelphia collar for 6 wks F/B soft collar for 4 wks * ACCF received halo vest |
| n = 25  Mean age: 50.3 ± 7.5 range (42-73) years  Sex: 19/25 (76%) male  F/U rate: NR  F/U time: 87.3 ± 21.7 range (61–132) mos | | n= 15  Mean age 54.1 ± 9.8 range (45-70) years  Sex: 11/15 (73%) male  F/U rate: NR  F/U time: 94.3 ± 25.3 range (72–171) mos |
| Hilibrand (2002) | Retrospective cohort  F/U time: 56 months  F/U rate: 190/252 (75.4%) | N = 190 | | | Two-level: 98/131 (75%)  Three-level: 33/131 (25%) | One-level: 16/59 (27%)  Two-level: 21/59 (36%)  Three-level: 20/59 (34%)  Four-level: 2/59 (3%) | ACDF with:   * Iliac crest grafting | ACCF with:   * Iliac crest or fibular strut grafting | * Two-poster cervical orthosis or rigid collar (n = 174) * Halo (n = 9) * Soft collar (n = 4) * Postop immobilization not recorded (n = 3) |
| n = 131  Mean age: 53 range (24-81) years  Sex: 66/131 (50.4%) male  F/U rate: NR  FU/ time: 73 months (range, 24**–**183 months) | | n = 59  Mean age: 58 range (19-83) years  Sex: 30/59 (51%) male  F/U rate: NR  F/U time: 57 months (range, 24**–**149 months) |
| Yang Liu (2012) [Spine] | Retrospective cohort  F/U time: average 26.1 range (11-40) months  F/U rate: NR | N = 180  Mean age: 46.7 range (31-74) years  Sex: NR | | | Three-level: 69/69 (100%) | Three-level: 39/39 (100%) | ACDF with:   * Interbody cages * Atlantis plate | ACCF with:   * Titanium mesh cage * Atlantis plate | * Philadelphia collar used for 6-8 weeks |
| n = 69/180 (38%)  Mean age: 46.1 ± 6.8 years  Sex: 39/69 (56.5%)  Mean follow-up: 26.8 range (12-39) months | | n = 39/180 (22%)  Mean age: 47.8 ± 6.4 years  Sex: 26/39 (66.7%)  Mean follow-up: 26.4 range (12-37) months |  |
| Yang Liu (2012) [European Spine] | Retrospective cohort  F/U time: 3.6 range (1.5-6) years  F/U rate: NR | N = 286\*  Mean age: 53.8 range (33-74) years  Sex: 166/286 (40.6%) male | | | Three-level: 103/103 (100%) | Three-level: 87/87 (100%) | ACDF with:   * Titanium mesh or cage * Semi-restricted plate | ACCF with:   * Titanium mesh or cage * Semi-restricted plate | * Philadelphia collar used for 3 weeks |
| n = 103  Mean age: 53.5 ± 8.5 range (33-69) years  Sex: 57/103 (55%) male | | n = 87  Mean age: 53.7 ± 7.8 range (34-67) years  Sex: 51/87 (58.6%) male |
| Multiple discectomies (A) versus discectomy-corpectomy hybrid (C) | | | | | | | | |  |
| Guo (2011) | Retrospective cohort  F/U time: 37 months  F/U rate: NR | A | C | | A | C | A | C |  |
| N = 120\*  Mean age: 53.5 ± 9.6 years range (34-77) years  Sex: 67/120 (56%) male | | | Three-level: 43/43 (100%) | Three-level: 53/53 (100%) | ACDF with:   * Interbody cage * Anterior cervical locking plate * Segmental fixation | ACHDF with:   * Interbody cage * Anterior cervical locking plate * Segmental fixation | * Philadelphia collar used for 3 months |
| n = 43  Mean age: 52.7 ± 9.4 years  Sex: 24/43 (56%) male  F/U time: 37.7 ± 7.2 mo | | n = 53  Mean age: 53.4 ± 9.5 years  Sex: 35/53 (66%) male  F/U time: 37.3 ± 7.0 mo |
| Yang Liu (2012) [Spine] | Retrospective cohort  F/U time: average 26.1 range (11-40) months  F/U rate: NR | N = 180\*  Mean age: 46.7 range (31-74) years  Sex: NR | | | Three-level: 69/69 (100%) | Three-level: 72/72 (100%) | ACDF with:   * Interbody cage * Anterior cervical locking plate   Segmental fixation | ACHDF with:   * One level ACDF/one level ACCF | * Philadelphia collar used for 6-8 weeks |
| n = 69/180 (38%)  Mean age: 46.1 ± 6.8 years  Sex: 39/69 (56.5%)  Mean follow-up: 26.8 range (12-39) months | | n = 72/180 (40%)  Mean age: 46.9 ± 7.1  Sex: 44/72 (61%)  Mean follow-up: 25.6 range (11-40) months |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Yang Liu (2012) [European Spine] | Retrospective cohort  F/U time: 3.6 range (1.5-6) years  F/U rate: NR | N = 286\*  Mean age: 53.8 range (33-74) years  Sex: 166/286 (58%) male | | Three-level: 103/103 (100%) | Three-level: 96/96 (100%) | | ACDF with:   * Titanium mesh or cage * Semi-restricted plate | ACHDF with:   * Titanium mesh or cage * Semi-restricted plate | * Philadelphia collar used for 3 weeks |
| n = 103  Mean age: 53.5 ± 8.5  Sex: 57/103 (55%) male | n = 96  Mean age: 54.4 ± 7.8  Sex: 58/96 (60%) male |
| Multiple corpectomies (B) versus discectomy-corpectomy hybrid (C) | | | | | | | | |  |
| Wei-bing (2009) | Retrospective cohort  F/U time: median 20 months (range: 1.5-2 yrs)  F/U rate: 59/66 (89.4%) | B | C | B | | C | B | C |  |
| N=59  Mean age: NR  Sex: NR | | Chord compression:  >50%: 8/39 (21%)  <50%: 31/39 (79%)  OPLL:  Positive: 8/39 (21%)  Negative: 31/39 (79%)  Osteoporosis:  Yes: 7/39 (18%)  No: 32/39 (82%)  2-level: 39/39 (100%) | | Chord compression:  >50%: 4/20 (20%)  <50%: 16/20 (80%)  OPLL:  Positive: 4/20 (20%)  Negative: 16/20 (80%)  Osteoporosis:  Yes: 4/20 (20%)  No: 16/20 (80%)  2-level: 20/20 (100%) | ACCF with:   * Segmental fixation | ACHDF with:   * Segmental fixation * Cervical fusion cage | * Philadelphia collar used for 3 months |
| n = 39  Mean age: 61.9 ± 9.7 years  Sex: 29/39 (74%) male | n = 20  Mean age: 58.8 ± 10.1 years  Sex: 12/20 (60%) male |
| Yong Liu (2009) [Zhejiang] | Retrospective cohort  F/U time: mean 17.3 mos, range (6-36) mos  F/U rate: NR | N = 28  Mean age: 53.5 range (45-66) years  Sex: 19/28 (67.9 %) male | | Two-levels: 16/16 (100%) | | Three-levels: 12/12 (100%) | ACCF with:   * Hybrid plate/Zephir plate fixation * Cervical fusion cage | ACHDF with:   * Hybrid plate fixation * Cervical fusion cage (Solis) | No ancillary stabilization reported |
| n = 16  Mean age: NR  Sex: NR | n = 12  Mean age: NR  Sex: NR |
| Lian (2010) | Randomized Control Trial  F/U time: mean 31.5 range (24–48) months  F/U rate: 105/110 (95%) | N= 105  Mean age: 60.2 range (38–78) years  Sex: 63/105 (60%) male | | Three-levels: 42/50 (84%)  Four-levels: 8/50 (16%) | | Three-levels: 45/55 (82%)  Four-levels: 10/55 (18%) | ACCF with:   * Titanium mesh cage * Anterior cervical plate | ACHDF with:   * PEEK cage or titanium mesh cage * Anterior cervical plate | * Cervical collar applied within 3 months |
| n = 50/105  Mean age: 60.8 years  Sex: 30/50 (60%) male | n = 55/105  Mean age: 59.7 years  Sex: 33/55 (60%) male |
| Yang Liu (2012) [Spine] | Retrospective cohort  F/U time: average 26.1 range (11-40) months  F/U rate: NR | N = 180\*  Mean age: 46.7 range (31-74) years  Sex: NR | | Three-levels: 39/39 (100%) | | Three-levels: 72/72 (100%) | ACCF with:   * Titanium mesh cage * Atlantis plate | ACHDF with:   * One level ACDF/one level ACCF | * Philadelphia collar used for 6-8 weeks |
| n = 39/180 (22%)  Mean age: 47.8 ± 6.4 years  Sex: 26/39 (66.7%)  Mean follow-up: 26.4 range (12-37) months | n = 72/180 (40%)  Mean age: 46.9 ± 7.1 years  Sex: 44/72 (61%)  Mean follow-up: 25.6 range (11-40) months |
| Yang Liu (2012) [European Spine] | Retrospective cohort  F/U time: 3.6 range (1.5-6) years  F/U rate: NR | N = 286\*  Mean age: 53.8 range (33-74) years  Sex: 166/286 (58%) male | | Three-levels: 87/87 (100%) | | Three-levels: 96/96 (100%) | ACCF with:   * Titanium mesh or cage * Semi-restricted plate | ACHDF with:   * Titanium mesh or cage * Semi-restricted plate | * Philadelphia collar used for 3 weeks |
| n = 87  Mean age: 53.7 ± 7.8 range (34-67) years  Sex: 51/87 (58.6%) male | n = 96  Mean age: NR  Sex: NR |
| Guo (2011) | Retrospective cohort  F/U time: 37 months  F/U rate: NR | N = 120\*  Mean age: 53.5 ± 9.6 range (34-77) years  Sex: 67/120 (56%) male | | Three-level: 24/24 (100%) | | Three-level: 53/53 (100%) | ACCF with:   * Interbody cage * Anterior cervical locking plate | ACHDF with:   * Interbody cage * Anterior cervical locking plate   Segmental fixation | * Philadelphia collar used for 3 months |
| n = 24  Mean age: 55.2 ± 10.1 years  Sex: 13/24 (54%) male  F/U time: 37.3 ± 7.3 mo | n = 53  Mean age: 53.4 ± 9.5 years  Sex: 35/53 (66%) male  F/U time: 37.3 ± 7.0 mo |

**Liu 2012 [Spine]: \***This number represents the full population used in the study, however the comparisons only include 2 of the multiple experimental groups.

**Liu 2012 [European Spine]: \***This number represents the full population used in the study, however the comparisons only include 2 of the multiple experimental groups.

**Guo 2011:** \*This number represents the full population used in the study, however the comparisons only include 2 of the multiple experimental groups.

ACCF: anterior cervical discectomy and fusion

ACDF: anterior cervical corpectomy and fusion

ACHDF: anterior cervical hybrid decompression and fusion

**Table 2. Detailed clinical outcome results for studies comparing discectomy vs. corpectomy. vs discectomy-corpectomy hybrid in patients with multi-level CSM**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Neurological** | | **Function** | | **Pain** | |
| Multiple discectomies (A) versus single or multiple corpectomies (B) | | | | | | |
| Oh  (2009) | A | B | A | B | A | B |
| JOA:  Pre: 13.5 ± 1.2  Post: 15.25 ± 1.5 | JOA:  Pre: 13.38 ± 2.1  Post: 14.72 ± 1.7 | Total ROM:  Pre: 35.00 ± 17.8  Post: 28.13 ± 13.4  Segmental ROM:  Pre: 12.85 ± 8.9  Post: 3.88 ± 3.4 | Total ROM:  Pre: 41.67 ± 9.2  Post: 30.23 ± 15.1  Segmental ROM:  Pre: 16.43 ± 7.8  Post: 5.12 ± 4.8 | VAS:  Neck:  Pre: 5.71 ± 3.0‡  Post: 2.93 ± 2.5‡  Arm:  Pre: 6.93 ± 2.0  Post: 2.79 ± 2.3 | VAS:  Neck:  Pre: 3.69 ± 2.9  Post: 3.63 ± 2.3  Arm:  Pre: 5.63 ± 3.2  Post: 2.63 ± 2.7 |
| Hilibrand  (2002) | NR | NR | NR | NR | Clinical Outcomes:\*  Excellent: 50/131 (38.2%)  Good: 60/131 (45.8%)  Fair: 19/131 (14.5%)  Poor: 2/131 (1.5%) | Clinical Outcomes:\*  Excellent: 23/59 (39%)  Good: 29/59 (49.2%)  Fair: 6/59 (10.2%)  Poor: 1/59 (1.6%) |
| Guo  (2011) | JOA:  Pre: 8.3 ± 1.7  Post: 13.7 ± 1.9†  Improvement: 0.6 ± 0.2 | JOA:  Pre: 7.7 ± 1.6  Post: 13.0 ± 2.0†  Improvement: 0.6 ± 0.1 | NR | NR | NR | NR |
| Lin  (2012) | JOA:  Pre-op: 9.25 ± 1.9  Post-op: 13.86 ± 1.6 | JOA:  Pre-op: 8.86 ± 1.9  Post-op: 13.27 ± 1.8 | NDI:  Pre-op: 12.56 ± 3.0  Post-op: 3.44 ± 1.7\*  Odom’s Scale:  Excellent: 16/57 (28%)  Good: 29/57 (51%)  Fair: 9/57 (16%)  Poor: 3/57 (5%) | NDI:  Pre-op: 12.21 ± 3.4  Post-op: 5.68 ± 2.6\*  Odom’s Scale:  Excellent: 14/63 (22%)  Good: 30/63 (47%)  Fair: 13/63 (21%)  Poor: 6/63 (10%) | NR | NR |
| Song  (2012) | JOA:  Pre: 11.1 ± 3.1  3 mo: 14.1 ± 2.3\*  Final: 13.9 ± 2.2  Recovery rate:  3 mo: 56.7 ± 30.6 %  Final: 52.3 ± 29.1 % | JOA:  Pre: 11.4 ± 3.4  3 mo: 14.9 ± 2.7\*\*  Final: 13.6 ± 2.9  Recovery rate:  3 mo: 60.1 ± 23.3 %  Final: 59.74 ± 22.2 % | NR | NR | VAS:  Pre: 6.84 ± 3.8  3 mo: 3.21 ± 2.7 | VAS:  Pre: 5.97 ± 2.3  3 mo: 2.53 ± 2.3 |
| Yang Liu  (2012)  [Spine] | JOA:  Pre: 10.8 ± 1.8  Post: 14.1 ± 1.6\* | JOA:  Pre: 10.6 ± 1.4  Post: 14.5 ± 1.8\* | NDI:  Pre: 35.1 ± 2.9  Post: 13.6 ± 2.8\* | NDI:  Pre: 35.3 ± 3.0  Post: 14.0 ± 2.9\* | Odom’s Criteria:  Excellent: 23/69 (33.3%)  Good: 35/69 (50.7%)  Fair: 9/69 (13%)  Bad: 2/69 (3%) | Odom’s Criteria:  Excellent: 10/39 (25.6%)  Good: 21/39 (53.8%)  Fair: 5/39 (12.8%)  Bad: 3/39 (7.8%) |
| Yang Liu  (2012)  [European Spine] | JOA:  Pre: 10.2 ± 2.7  Post: 14.8 ± 2.2 | JOA:  Pre: 10.7 ± 3.1  Post: 14.5 ± 2.7 | NDI:  Pre: 35.6 ± 3.3  Post: 14.7 ± 3.0 | NDI:  Pre: 35.2 ± 2.8  Post: 16.0 ± 3.1 | SF-36:  Pre: 33.2 ± 2.1  Post: 58.5 ± 2.7 | SF-36:  Pre: 34.5 ± 3.3  Post: 49.6 ± 2.9 |
| Multiple discectomies (A) versus discectomy-corpectomy hybrid (C) | | | | | | |
| Guo  (2011) | A | C | A | C | A | C |
| JOA:  Pre: 8.3 ± 1.7  Post: 13.7 ± 1.9†  Improvement: 0.6 ± 0.2 | JOA:  Pre: 8.1 ± 2.2  Post: 13.1 ±2.3†  Improvement: 0.6 ± 0.2 | NR | NR | NR | NR |
| Yang Liu  (2012)  [Spine] | JOA:  Pre: 10.8 ± 1.8  Post: 14.1 ± 1.6\* | JOA:  Pre: 11.2 ± 1.9  Post: 13.8 ± 1.9\* | NDI:  Pre: 35.1 ± 2.9  Post: 13.6 ± 2.8\* | NDI:  Pre: 34.7 ± 2.6  Post: 14.2 ± 3.1\* | Odom’s Criteria:  Excellent: 23/69 (33.3%)  Good: 35/69 (50.7%)  Fair: 9/69 (13%)  Bad: 2/69 (3%) | Odom’s Criteria:  Excellent: 21/72 (29.2%)  Good: 39/72 (54.2%)  Fair: 10/72 (13.9%)  Bad: 2/72 (2.7%) |
| Yang Liu  (2012)  [European Spine] | JOA:  Pre: 10.2 ± 2.7  Post: 14.8 ± 2.2 | JOA:  Pre: 11.3 ± 2.5  Post: 13.9 ± 2.8 | NDI:  Pre: 35.6 ± 3.3  Post: 14.7 ± 3.0 | NDI:  Pre: 34.9 ± 2.9  Post: 14.3 ± 2.6 | SF-36:  Pre: 33.2 ± 2.1  Post: 58.5 ± 2.7 | SF-36:  Pre: 35.8 ± 2.3  Post: 52.2 ± 2.4 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Multiple corpectomies (B) versus discectomy-corpectomy hybrid (C) | | | | | | |
| Wei-bing  (2009) | B | C | B | C | B | C |
| JOA:  Pre-op: 12.3 ± 2.9  Post-op:  1 wk: 14.1 ± 1.8  6 mo: 15.4 ± 1.3  12 mo: 15.6 ± 1.4  18 mo: 15.7 ± 1.2 | JOA:  Pre-op: 12.6 ± 2.8  Post-op:  1 wk: 14.4 ± 1.5  6 mo: 15.5 ± 1.1  12 mo: 15.6 ± 1.0  18 mo: 15.5 ± 0.9 | Functional Improvement Rate:  Post-op:  1 wk: 32.1 ± 21.4  6 mo: 67.7 ± 20.1  12 mo: 70.4 ± 33.4  18 mo: 71.1 ± 26.2\* | Functional Improvement Rate:  Post-op:  1 wk: 31.2 ± 27.1  6 mo: 64.1 ± 22.2  12 mo: 62.7 ± 31.3  18 mo: 54.7 ± 35.3 | NR | NR |
| Yong Liu  (2009)  [Zhejiang] | JOA:  Pre: 10.9 ± 0.6  Post: 14.3 ± 0.7  Improvement rate (%): 56.8 ± 8.9 | JOA:  Pre: 11.2 ± 0.8  Post: 14.3 ± 0.5  Improvement rate (%): 55.8 ± 4.0 | NDI:  Pre: 34.6 ±3.4  Post: 17.2 ± 3.0 | NDI:  Pre: 34.3 ± 2.8  Post: 14.9 ± 2.8 | NR | NR |
| Lian  (2010) | JOA:  Pre: 8.8  6 mo: 13.4  Final: 14.1 | JOA:  Pre: 9.1  6 mo: 13.2  Final: 14.0 | NR | NR | VAS:  Pre-op: 49.3 ± 13.3  Post-op:  1 day: 44.8 ± 9.6  1 week: 31.2 ± 9.6  1 month: 15.7 ± 8.1  3 months: 12.6 ± 7.5  6 months: 13.3 ± 7.1\*  Final: 14.3 ± 8.1\* | VAS:  Pre-op: 50.1 ± 13.7  Post-op:  1 day: 45.2 ± 12.7  1 week: 29.8 ± 10.3  1 month: 13.6 ± 8.2  3 months: 9.3 ± 6.4  6 months: 8.2 ± 5.9\*  Final: 9.5 ± 5.8\* |
| Yang Liu  (2012)  [Spine] | JOA:  Pre: 10.6 ± 1.4  Post: 14.5 ± 1.8\* | JOA:  Pre: 11.2 ± 1.9  Post: 13.8 ± 1.9\* | NDI:  Pre: 35.3 ± 3.0  Post: 14.0 ± 2.9\* | NDI:  Pre: 34.7 ± 2.6  Post: 14.2 ± 3.1\* | Odom’s Criteria:  Excellent: 10/39 (25.6%)  Good: 21/39 (53.8%)  Fair: 5/39 (12.8%)  Bad: 3/39 (7.8%) | Odom’s Criteria:  Excellent: 21/72 (29.2%)  Good: 39/72 (54.2%)  Fair: 10/72 (13.9%)  Bad: 2/72 (2.7%) |
| Yang Liu  (2012)  [European Spine] | JOA:  Pre: 10.7 ± 3.1  Post: 14.5 ± 2.7 | JOA:  Pre: 11.3 ± 2.5  Post: 13.9 ± 2.8 | NDI:  Pre: 35.2 ± 2.8  Post: 16.0 ± 3.1 | NDI:  Pre: 34.9 ± 2.9  Post: 14.3 ± 2.6 | SF-36:  Pre: 34.5 ± 3.3  Post: 49.6 ± 2.9 | SF-36:  Pre: 35.8 ± 2.3  Post: 52.2 ± 2.4 |
| Guo  (2011) | JOA:  Pre: 7.7 ± 1.6  Post: 13.0 ± 2.0†  Improvement: 0.6 ± 0.1 | JOA:  Pre: 8.1 ± 2.2  Post: 13.1 ±2.3†  Improvement: 0.6 ± 0.2 | NR | NR | NR | NR |

**Oh 2009: \*** P = 0.047 for preoperative segmental height; \*\* P = 0.047 for immediate segmental height; † P = 0.018 for postoperative segmental height; †† P = 0.009 for cervical lordosis; ‡ Neck VAS was significantly different pre to post-operative at ACDF group (P < 0.01).

\*spinal chord function improvement rate in the 2 groups (X ± S, %)

**Song 2012: \*** P = 0.027 for JOA score 3 months postoperatively for Group A; \*\* P = 0.021 for JOA score 3 months postoperatively for Group B.

**Lian 2010: \***P < 0.05 for VAS score at 6 months and final follow-up for both groups.

**Liu 2012 [Spine]: \*** P < 0.05 within group for JOA, NDI.

**Table 3. Detailed radiographic and perioperative outcome results for studies comparing discectomy vs. corpectomy. vs discectomy-corpectomy hybrid in patients with multi-level CSM.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Fusion Rate (%)** | | **Sagittal Alignment (degrees)** | | **Complication Rate (%)** | | |
| Multiple discectomies (A) versus corpectomy (B) | | | | | | |
| Oh  (2009) | A | B | A | B | A | B |
| 6 months:  14/14 (100%) | 6 months:  17/17 (100%) | Segmental Height (cm):  Pre: 5.54 ± 0.6 \*  Immediate: 5.69 ± 0.7\*\*  Post: 5.60 ± 0.7†  Cervical Lordosis:  Pre: 20.5 ± 11.2  Post: 23.43 ± 7.4†† | Segmental Height (cm):  Pre: 5.18 ± 0.5  Immediate: 5.12 ± 0.3  Post: 4.99 ± 0.5  Cervical Lordosis:  Pre: 17.35 ± 10.9  Post: 14.59 ± 10.6 | HD (days): 15.14 ± 8.5  Bleeding (cc): 306.43 ± 151.1\*\*  OP time (min): 140.71 ± 44.5\*\* | HD (days): 16.82 ± 7.7  Bleeding (cc): 778.8 ± 644.3\*\*  OP time (min): 210 ± 6\*\*  Surgery-related complications: 3/17 (17.6%)  Hoarseness: 1/17 (5.9%)  Dura laceration: 1/17 (5.9%)  Upper extremity weakness: 1/17 (5.9%) |
| Hilibrand (2002) | Arthrodesis: Multilevel: 87/131 (66.4%)  2-level: 68/98 (69%)  3-level: 19/33 (58%) | Arthrodesis: Total: 55/59 (93.2%)  1-level: 15/16 (94%)  2-level: 18/21 (88%)  3-level: 20/20 (100%)  4-level: 2/2 (100%) | NR | NR | NR | Graft-related complications: 6/59 (10.2%) |
| Guo  (2011) | 42/43 (97.7%) | 23/24 (95.8%) | Segmental angle:  Pre: 0.6 ±10.4  Post: 15.6 ± 6.4†  Mean improvement (°): 15.1 ± 8.4‡  C2-C7 angle (°):  Pre: -0.1 ± 12.6  Post: 14.9 ± 7.2†  Mean improvement (°): 15.1 ± 9.9‡ | Segmental angle:  Pre: 7.5 ± 6.8  Post: 9.8 ± 7.0†  Mean improvement (°): 2.3 ± 1.9‡  C2-C7 angle (°):  Pre: 8.7 ± 9.5  Post: 11.4 ± 7.5†  Mean improvement (°): 2.7 ± 4.5‡ | Overall: 1/43 (2.3%)  Hematoma: 0/43 (0%)  Pseudarthrosis: 1/43 (2.3%)  C5 palsy: 0/43 (0%)  Implant failure: 0/43 (0%)  Titanium mesh subsidence: 0/43 (0%)  CSF leaks: 0/43 (0%) | Overall: 6/24 (25%)§  Hematoma: 1/24 (4.2%)  Pseudarthrosis: 0/24 (0%)  C5 palsy: 0/24 (0%)  Implant Failure: 1/24 (4.2%)  Titanium mesh subsidence: 3/24 (12.5%)  CSF leaks: 1/24 (4.2%) |
| Lin  (2012) | NR | NR | Segmental Lordosis:  Pre-op: 9.79 ± 3.4  Post-op: 17.75 ± 2.6\*\* | Segmental Lordosis:  Pre-op: 9.54 ± 3.0  Post-op: 14.49 ± 2.5\*\* | Surgery related complications: 11/57 (19.3%)  Blood Loss: 102.81 ± 51.3 ml†  Operation time: 138.07 ± 30.9 min‡  CSF: 2/57 (3.5%)  Hoarseness: 2/57 (3.5%)  Epidural hematoma: 1/57 (1.8%)  C5 radiculopathy: 2/57 (3.5%)  Dysphagia: 4/57 (7.0%)  Instrumentation/graft-related complications: 0/57 (0%)§  Dislodgment: 0/57 (0.0%)  Subsidence: 0/57 (0.0%) | Surgery related complications:20/63 (31.7%)  Blood Loss: 149.05 ± 74 ml†  Operation time: 125.08 ± 26.4 min‡  CSF: 1/63 (1.6%)  Hoarseness: 3/63 (4.8%)  Epidural hematoma: 2/63 (3.2%)  C5 radiculopathy: 3/63 (4.8%)  Dysphagia: 5/63 (8.0%)  Instrumentation/graft-related complications: 6/63 (9.5%)§  Dislodgment: 2/63 (3.2%)  Subsidence: 4/63 (6.3%) |
| Song  (2012) | Fusion rate:  22/25 (88.0%) | Fusion rate:  14/15 (93.3%) | Final difference of segmental height: 2.1 ± 1.6\*  Cervical Lordosis:  Pre: 2.47 ± 5.56 (-3 to 9°)  3 mo: 10.21 ± 3.4 (7 to 14°)\*\*  Final: 7.21 ± 4.1 (3 to 12°)† | Final difference of segmental height: 4.7 ± 2.6\*  Cervical Lordosis:  Pre: 1.04 ± 11.07 (-10 to 13°)  3 mo: 6.07 ± 5.9 (1 to 13°)\*\*  Final: 3.93 ± 6.7 (-3 to 9°)† | Hospital stay (days): 10.74 ± 4.1  Blood loss (ml): 621.33 ± 138.7  OP time (min): 186.3 ± 58.3  ALD: 16/25 (64%)  Revision surgery: 2/25 (8%)  Hardware related: 2/25 (8%)  Pseudoarthrosis: 3/25 (12%)  Pseudoarthrosis in smokers: 2/10 (20%)  Dysphagia: 3/25 (12%)  Hoarseness: 2/25 (8%)  Donor site pain: 1/25 (4%)  Graft related: 0/25 (0%)  Dural tear: 0/25 (0%) | Hospital stay (days): 18.43 ± 7.7  Blood loss (ml): 1011.28 ± 533.4  OP time (min): 268.4 ± 65.2  ALD: 8/15 (53.3%)  Revision surgery: 1/15 (6.7%)  Hardware related: 0/15 (0%)  Pseudoarthrosis: 1/15 (6.7%)  Pseudoarthrosis in smokers: 1/6 (16.7%)  Dysphagia: 3/15 (20%)  Hoarseness: 2/15 (13.3%)  Donor site pain: 4/15 (26.7%)  Graft related: 2/15 (13.3%)  Dural tear: 1/15 (6.7%) |
| Yang Liu (2012)  [Spine] | 69/69 (100%) | 33/39 (84.6%) | Cervical Lordosis:  C2-C7 angle (°):  Pre: 11.87 ± 11.71  Final: 24.27 ± 10.17\*  Segmental lordosis (°):  Pre: 4.97 ± 8.26  Post: 18.66 ± 7.78\* | Cervical Lordosis:  C2-C7 angle (°):  Pre: 12.07 ± 11.82  Final: 15.63 ± 12.41  Segmental lordosis (°):  Pre: 5.98 ± 8.63  Post: 15.73 ± 6.31 | Operation time: 143.6 ± 31.7\*\*  Blood loss: 107.5 ± 49.6\*\*  Hardware breakage: 0/69 (0%)  Graft dislodgement: 0/69 (0%)  Subsidence: 0/69 (0%)  Dysphagia: 8/69 (11.6%)  Hoarseness: 3/69 (4.3%)  C5 palsy: 2/69 (2.9%)  Cerebral fluid leakage: 1/69 (1.4%)  Epidural hematoma: 1/69 (1.4%)  Infection: 0/69 (0%)  Total: 15/69 (21.7%) | Operation time: 116.5 ± 29.8\*\*  Blood loss: 172.3 ± 68.2\*\*  Hardware breakage: 0/39 (0%)  Graft dislodgement: 2/39 (5.1%)  Subsidence: 3/39 (7.7%)  Dysphagia: 4/39 (10.3%)  Hoarseness: 2/39 (5.1%)  C5 palsy: 4/39 (10.3%)  Cerebral fluid leakage: 0/39 (0%)  Epidural hematoma: 1/39 (2.6%)  Infection: 1/39 (2.6%)  Total: 17/39 (43.6%) |
| Yang Liu (2012) [European Spine] | 100% | 92.0% | NR | NR | Graft malfunction: 0/0 (0%)  Dysphagia: 6/103 (5.82%)  Hoarneness: 4/103 (3.88%)  C5 palsy: 4/103 (3.88%)  Cerebral fluid leakage: 2/103 (1.94%)  Wound infection: 0/0 (0%)  Total: 16/103 (15.53%) | Graft malfunction: 7/87 (8.05%)  Dysphagia: 2/87 (2.30%)  Hoarneness: 3/87 (3.45%)  C5 palsy: 10/87 (11.49%)  Cerebral fluid leakage: 0/0 (0%)  Wound infection: 1/87 (1.15%)  Total: 23/87 (26.44%) |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Multiple discectomies (A) versus discectomy-corpectomy hybrid (C) | | | | | | |
| Guo  (2011) | A | C | A | C | A | C |
| 42/43 (97.7%) | 53/53 (100%) | Segmental angle:  Pre: 0.6 ±10.4  Post: 15.6 ± 6.4†  Mean improvement (°): 15.1 ± 8.4‡  C2-C7 angle (°):  Pre: -0.1 ± 12.6  Post: 14.9 ± 7.2†  Mean improvement (°): 15.1 ± 9.9‡ | Segmental angle:  Pre: 6.9 ± 8.3  Post: 16.3 ± 7.2†  Mean improvement (°): 9.4 ± 5.2‡  C2-C7 angle (°):  Pre: 9.7 ± 8.6  Post: 17.8 ± 7.7†  Mean improvement (°): 8.1 ± 5.2‡ | Overall: 1/43 (2.3%)  Pseudarthrosis: 1/43 (2.3%)  Hematoma: 0/43 (0.0%)  C5 palsy: 0/43 (0.0%)  Titanium mesh subsidence: 0/43 (0.0%)  CSF leaks: 0/43 (0.0%) | Overall: 8/53 (15.1%)  Pseudarthrosis: 0/53 (0.0%)  Hematoma: 1/53 (1.9%)  C5 palsy: 1/53 (1.9%)  Titanium mesh subsidence: 5/53 (9.4%)  CSF leaks: 1/53 (1.9%) |
| Yang Liu (2012)  [Spine] | 69/69 (100%) | 68/72 (94.4%) | Cervical Lordosis:  C2-C7 angle (°):  Pre: 11.87 ± 11.71  Final: 24.27 ± 10.17\*  Segmental lordosis (°):  Pre: 4.97 ± 8.26  Post: 18.66 ± 7.78\* | Cervical Lordosis:  C2-C7 angle (°):  Pre: 13.75 ± 10.98  Final: 23.21 ± 9.55  Segmental lordosis (\*):  Pre: 7.83 ± 9.87  Post: 20.30 ± 10.38 | Operation time: 143.6 ± 31.7\*\*  Blood loss: 107.5 ± 49.6\*\*  Hardware breakage: 0/69 (0%)  Graft dislodgement: 0/69 (0%)  Subsidence: 0/69 (0%)  Dysphagia: 8/69 (11.6%)  Hoarseness: 3/69 (4.3%)  C5 palsy: 2/69 (2.9%)  Cerebral fluid leakage: 1/69 (1.4%)  Epidural hematoma: 1/69 (1.4%)  Infection: 0/69 (0%)  Total: 15/69 (21.7%) | Operation time: 129.4 ± 25.9\*\*  Blood loss: 141.5 ± 52.8\*\*  Hardware breakage: 1/72 (1.4%)  Graft dislodgement: 2/72 (2.8%)  Subsidence: 1/72 (1.4%)  Dysphagia: 7/72 (9.7%)  Hoarseness: 2/72 (2.8%)  C5 palsy: 2/72 (2.8%)  Cerebral fluid leakage: 0/72 (0%)  Epidural hematoma: 0/72 (0%)  Infection: 1/72 (1.4%)  Total: 16/72 (22.2%) |
| Yang Liu (2012) [European Spine] | 100% | 95.8% | NR | NR | Graft malfunction: 0/0 (0%)  Dysphagia: 6/103 (5.82%)  Hoarneness: 4/103 (3.88)  C5 palsy: 4/103 (3.88)  Cerebral fluid leakage: 2/103 (1.94%)  Wound infection: 0/0 (0%)  Total: 16/103 (15.53%) | Graft malfunction: 4/96 (4.17%)  Dysphagia: 5/96 (5.21%)  Hoarneness: 3/96 (3.13%)  C5 palsy: 8/96 (8.33%)  Cerebral fluid leakage: 1/96 (1.04%)  Wound infection: 1/96 (1.04%)  Total: 22/96 (22.92%) |
| **Study** | **Fusion Rate (%)** | | **Sagittal Alignment (degrees)** | | **Complication Rate (%)** | |
| Multiple corpectomies (B) versus discectomy-corpectomy hybrid (C) | | | | | | |
| Wei-bing (2009) | B | C | B | C | B | C |
| NR | NR | NR | NR | Graft dislodgment: 3/39 (7.7%)  Graft/plate migration: 4/39 (10.3%)  Loosening rate: 17.9%  Revision: 4/39 (10.3%)  >3mo. Stabilization: 3/39 (7.7%) | >3mo. Stabilization: 2/20 (10%) |
| Yong Liu (2009) [Zhejiang] | 94% | 100% | Segmental lordosis (°):  Pre: 5.063 ± 11.980  Post: 13.000 ± 4.351 | Segmental lordosis (°):  Pre: 3.750 ± 9.450  Post: 10.667 ± 3.676 | Unilateral deltoid weakness: 1/16 (6.3%)  C5 palsy: 1/16 (6.3%)  Implant complications: 0/16 (0%) | Implant complications: 0/12 (0%) |
| Lian  (2010) | 6 months: 32/50 (64%)  1 year: 48/50 (96%) | 6 months: 52/55 (94.5%)  1 year: 55/55 (100%) | Lordosis of C2-7 (°):  Pre-op: 6.7 ± 8.0  Post-op:  1 day: 13.1 ± 7.8  6 months: 11.2 ± 7.2  Final: 9.1 ± 6.8  Loss of cervical lordosis (°):  6 months: 2.0 ± 1.0  Final: 4.0 ± 1.4  Loss of height of fusion segments (mm):  6 months: 1.9 ± 0.7  Final: 3.1 ± 0.9 | Lordosis of C2-7 (°):  Pre-op: 6.4 ± 8.6  Post-op:  1 day: 14.2 ± 7.2  6 months: 13.4 ± 6.6  Final: 12.8 ± 6.3  Loss of cervical lordosis (°):  6 months: 0.8 ± 0.9  Final: 1.4 ± 1.3  Loss of height of fusion segments (mm):  6 months: 0.8 ± 0.5  Final: 1.0 ± 0.6 | Operative time (min): 168.3 ± 31.7\*  Blood loss (ml): 378.6 ± 111.4\*\*  Hematoma: 1/50 (2%)  Cerebral fluid leakage: 1/50 (2%)  Re-operation posteriorly: 2/50 (4%)  Recurrent laryngeal nerve palsy: 1/50 (2%)  C5 paresis: 0/50 (0%)  Axial pain: 4/50 (8%) | Operative time (min): 140.2 ± 27.1\*  Blood loss (ml): 269.1 ± 97.2\*\*  Hematoma: 0/55 (0%)  Cerebral fluid leakage: 2/55 (3.6%)  Re-operation posteriorly: 0/55 (0%)  Recurrent laryngeal nerve palsy: 1/55 (1.8%)  C5 paresis: 2/55 (3.6%)  Axial pain: 3/55 (5.5%) |
| Yang Liu  (2012)  [Spine] | 33/39 (84.6%) | 68/72 (94.4%) | Cervical Lordosis:  Pre: 12.07 ± 11.82†  C2-C7 angle (°):  Final: 15.63 ± 12.41  Segmental lordosis (°):†  Pre: 5.98 ± 8.63  Post: 15.73 ± 6.31 | Cervical Lordosis:  Pre: 13.75 ± 10.98†  C2-C7 angle (°):  Final: 23.21 ± 9.55  Segmental lordosis (°):†  Pre: 7.83 ± 9.87  Post: 20.30 ± 10.38 | Operation time: 116.5 ± 29.8\*\*  Blood loss: 172.3 ± 68.2\*\*  Hardware breakage: 0/39 (0%)  Graft dislodgement: 2/39 (5.1%)  Subsidence: 3/39 (7.7%)  Dysphagia: 4/39 (10.3%)  Hoarseness: 2/39 (5.1%)  C5 palsy: 4/39 (10.3%)  Cerebral fluid leakage: 0/39 (0%)  Epidural hematoma: 1/39 (2.6%)  Infection: 1/39 (2.6%)  Total: 17/39 (43.6%)† | Operation time: 129.4 ± 25.9\*\*  Blood loss: 141.5 ± 52.8\*\*  Hardware breakage: 1/72 (1.4%)  Graft dislodgement: 2/72 (2.8%)  Subsidence: 1/72 (1.4%)  Dysphagia: 7/72 (9.7%)  Hoarseness: 2/72 (2.8%)  C5 palsy: 2/72 (2.8%)  Cerebral fluid leakage: 0/72 (0%)  Epidural hematoma: 0/72 (0%)  Infection: 1/72 (1.4%)  Total: 16/72 (22.2%)† |
| Yang Liu  (2012)  [European Spine] | 92.0% | 95.8% | NR | NR | Graft malfunction: 7/87 (8.05%)  Dysphagia: 2/87 (2.30%)  Hoarneness: 3/87 (3.45%)  C5 palsy: 10/87 (11.49%)  Cerebral fluid leakage: 0/0 (0%)  Wound infection: 1/87 (1.15%)  Total: 23/87 (26.44%) | Graft malfunction: 4/96 (4.17%)  Dysphagia: 5/96 (5.21%)  Hoarneness: 3/96 (3.13%)  C5 palsy: 8/96 (8.33%)  Cerebral fluid leakage: 1/96 (1.04%)  Wound infection: 1/96 (1.04%)  Total: 22/96 (22.92%) |

**Oh 2009: \***P < 0.001 for Bleeding (cc) and OP time (minutes) between groups.

**Song 2012:** \*P = 0.041 for difference of segmental height between groups; \*\* P = 0.037 for cervical lordosis 3 months postoperatively between groups; † P = 0.024 for cervical lordosis at final follow-up between groups.

**Guo 2011:** PR-SA preop-segmental angle; PO-SA postop-segmental angle; PR-CA preop-C2-C7 angle; PO-CA postop-C2-C7 angle; MSAI mean segmental angle improvement; MCAI mean C2-C7 angle improvement. P < 0.01, compared with the preoperative data using paired t test; ‡ P < 0.01, compared with the other two groups using analysis of variance, § P < 0.05, compared with (A) using Fisher exact test.

**Lin 2012:** \*P = 0.000 for Post-op NDI scores between groups, \*\*P = 0.000 for Post-op Segmental lordosis between groups, †P = 0.000 for blood loss; ‡ P = 0.021 for operation time; § P = 0.032 for overall instrumentation and graft related complications.

**Lian 2010:** \*P < 0.05 for operative time between groups; \*\* P < 0.001 for blood loss between groups.

**Liu 2012 [Spine]: \*** P < 0.01 within group for C2-C7 angle at final follow-up and for the postoperative segmental angle at the final follow-up; \*\* P < 0.05 between groups for operation time and blood loss; † P < 0.05 between groups C and D for cervical lordosis, segmental lordosis and complication rates.

**Results tables:**

**Neck Disability Index**

**Table 4. Studies comparing discectomy to corpectomy for CSM based on NDI scores at last follow up.**

|  | **Discectomy** | | | **Corpectomy surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Lin**  **(2011)** | **Pre**  n = 57 | **Post**  58.7 mos | -9.2 ± 1.93 | **Pre**  n = 63 | **Post**  57.9 mos | -6.5 ± 2.04 | -2.7 ± 1.26 | <.0001 | -2.140 |
| 12.6 ± 3.0 | 3.4 ± 1.7 | 12.2 ± 3.4 | 5.7 ± 2.6 |
| **Liu (Spine)**  **(2012)** | **Pre**  n = 69 | **Post**  26.1 mos | -21.5 ± 1.80 | **Pre**  n = 39 | **Post**  26.1 mos | -21.3 ± 1.87 | -0.2 ± 1.16 | .59 | -0.172 |
| 35.1 ± 2.9 | 13.6 ± 2.8 | 35.3 ± 3.0 | 14.0 ± 2.9 |
| **Liu (ESJ)**  **(2012)** | **Pre**  n = 103 | **Post**  3.6 years | -20.9 ± 2.01 | **Pre**  n = 87 | **Post**  3.6 years | -19.2 ± 1.89 | -1.7 ± 1.24 | <.0001 | -1.372 |
| 35.6 ± 3.3 | 14.7 ± 3.0 | 35.2 ± 2.8 | 16.0 ± 3.1 |

\*Imputed using formula that includes pre and post standard deviation and a correlation coefficient coefficient of .80

\*\*Calculated by subtracting the posterior surgery change score from the anterior surgery change scores.

**Table 5. Studies comparing discectomy to discectomy-corpectomy hybrid surgery for CSM based on NDI scores at last follow up.**

|  | **Discectomy** | | | **Discectomy-Corpectomy hybrid surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Liu (Spine)**  **(2012)** | **Pre**  n = 69 | **Post**  26.1 mos | -21.5 ± 1.80 | **Pre**  n = 72 | **Post**  26.1 mos | -20.5 ± 1.86 | -1 ± 1.16 | .002 | -0.861 |
| 35.1 ± 2.9 | 13.6 ± 2.8 | 34.7 ± 2.6 | 14.2 ± 3.1 |
| **Liu (ESJ)**  **(2012)** | **Pre**  n = 103 | **Post**  3.6 years | -20.9 ± 2.01 | **Pre**  n = 96 | **Post**  3.6 years | -20.6 ± 1.76 | -0.3 ± 1.22 | .27 | -0.246 |
| 35.6 ± 3.3 | 14.7 ± 3.0 | 34.9 ± 2.9 | 14.3 ± 2.6 |

**†**Calculated by subtracting the mean change scores and dividing by the change score standard deviations. Positive scores indicate treatment favors anterior surgery.

NC = not calculable (standard deviations not reported)

**Table 6. Studies comparing corpectomy to discectomy-corpectomy hybrid surgery for CSM based on NDI scores at last follow up.**

|  | **Corpectomy** | | | **Discectomy-Corpectomy hybrid surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Liu (Spine)**  **(2012)** | **Pre**  n = 39 | **Post**  26.1 mos | -21.3 ± 1.87 | **Pre**  n = 72 | **Post**  26.1 mos | -20.5 ± 1.86 | -0.8 ± 1.18 | .03 | -0.678 |
| 35.3 ± 3.0 | 14.0 ± 2.9 | 34.7 ± 2.6 | 14.2 ± 3.1 |
| **Liu (ESJ)**  **(2010)** | **Pre**  n = 87 | **Post**  3.6 years | -19.2 ± 1.89 | **Pre**  n = 96 | **Post**  3.6 years | -20.6 ± 1.76 | 1.4 ± 1.16 | <.0001 | 1.207 |
| 35.2 ± 2.8 | 16.0 ± 3.1 | 34.9 ± 2.9 | 14.3 ± 2.6 |
| **Liu (Zhejiang)**  **(2009)** | **Pre**  n = 16 | **Post**  17.3 mos | -17.4 ± 2.06 | **Pre**  n = 12 | **Post**  17.3 mos | -19.4 ± 1.77 | 2 ± 1.24 | .01 | 1.611 |
| 34.6 ± 3.4 | 17.2 ± 3.0 | 34.3 ± 2.8 | 14.9 ± 2.8 |

**†**Calculated by subtracting the mean change scores and dividing by the change score standard deviations. Positive scores indicate treatment favors anterior surgery.

NC = not calculable (standard deviations not reported)

**Japanese Orthopedic Association Scores**

**Table 7. Studies comparing discectomy to corpectomy for CSM based on JOA scores at last follow-up.**

|  | **Discectomy** | | | **Corpectomy surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Oh**  **(2009)** | **Pre**  n = 14 | **Post**  24.9 mos | 1.8 ± 0.90 | **Pre**  n = 17 | **Post**  27.3 mos | 1.3 ± 1.26 | 0.5 ± 0.76 | .22 | 0.655 |
|  | 13.5 ± 1.2 | 15.3 ± 1.5 | 13.4 ± 2.1 | 14.7 ± 1.7 |
| **Guo**  **(2011)** | **Pre**  n = 43 | **Post**  37.7 mos | 0.6 ± 0.2 | **Pre**  n = 24 | **Post**  37.3 mos | 0.6 ± 0.1 | 1.77636E-15 ± 0.13 | 1.0 | 0.000 |
| 13.7 ± 1.9 | 14.3 | 13.0 ± 2.0 | 13.6 |
| **Song**  **(2012)** | **Pre**  n = 25 | **Post**  3 mos | 3.0 | **Pre**  n = 15 | **Post**  3 mos | 3.5 | NC | NC | NC |
| 11.1± 3.1 | 14.1 ± 2.3 | 11.4 ± 3.4 | 14.9 ± 2.7 |
| **Post**  87.3 mos | 2.8 ± 1.88 | **Post**  94.3 mos | 2.2 ± 2.05 | 0.6 ± 1.25 | .35 | 0.479 |
| 13.9 ± 2.2 | 13.6 ± 2.9 |
| **Lin**  **(2011)** | **Pre**  n = 57 | **Post**  58.7 mos | 4.6 ± 1.14 | **Pre**  n = 63 | **Post**  57.9 mos | 4.4 ± 1.17 | 0.2 ± 0.73 | .35 | 0.273 |
| 9.3 ± 1.9 | 13.9 ± 1.6 | 8.9 ± 1.9 | 13.3 ± 1.8 |
| **Liu (Spine)**  **(2012)** | **Pre**  n = 69 | **Post**  26.1 mos | 3.3 ± 1.09 | **Pre**  n = 39 | **Post**  26.1 mos | 3.9 ± 1.08 | -0.6 ± 0.69 | .007 | -0.873 |
| 10.8 ± 1.8 | 14.1 ± 1.6 | 10.6 ± 1.4 | 14.5 ± 1.8 |
| **Liu (ESJ)**  **(2010)** | **Pre**  n = 103 | **Post**  3.6 years | 4.6 ± 1.62 | **Pre**  n = 87 | **Post**  3.6 years | 3.8 ± 1.87 | 0.8 ± 1.13 | .002 | 0.708 |
| 10.2 ± 2.7 | 14.8 ± 2.2 | 10.7 ± 3.1 | 14.5 ± 2.7 |

NC – difference in change scores, P-values, and SMDs only calculated at final follow up.

\*Imputed using formula that includes pre and post standard deviation and a correlation coefficient coefficient of .80

\*\*Calculated by subtracting the posterior surgery change score from the anterior surgery change scores.

**Table 8. Studies comparing discectomy to discectomy-corpectomy hybrid surgery for CSM based on JOA scores at last follow up.**

|  | **Discectomy** | | | **Discectomy-Corpectomy hybrid surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Guo**  **(2011)** | **Pre**  n = 43 | **Post**  37.7 mos | 0.6 ± 0.2 | **Pre**  n = 53 | **Post**  37.3 mos | 0.6 ± 0.2 | 1.77636E-15 ± 0.13 | 1.0 | 0.000 |
| 13.7 ± 1.9 | 14.3 | 13.1 ± 2.3 | 13.7 |
| **Liu (Spine)**  **(2012)** | **Pre**  n = 69 | **Post**  26.1 mos | 3.3 ± 1.09 | **Pre**  n = 72 | **Post**  26.1 mos | 2.6 ± 1.20 | 0.7 ± 0.73 | .0004 | 0.955 |
| 10.8 ± 1.8 | 14.1 ± 1.6 | 11.2 ± 1.9 | 13.8 ± 1.9 |
| **Liu (ESJ)**  **(2010)** | **Pre**  n = 103 | **Post**  3.6 years | 4.6 ± 1.62 | **Pre**  n = 96 | **Post**  3.6 years | 2.6 ± 1.70 | 2 ± 1.05 | <.0001 | 1.900 |
| 10.2 ± 2.7 | 14.8 ± 2.2 | 11.3 ± 2.5 | 13.9 ± 2.8 |

**†**Calculated by subtracting the mean change scores and dividing by the change score standard deviations. Positive scores indicate treatment favors anterior surgery.

NC = not calculable (standard deviations not reported)

**Table 9. Studies comparing corpectomy to discectomy-corpectomy hybrid surgery for CSM based on JOA scores at last follow up.**

|  | **Corpectomy** | | | **Discectomy-Corpectomy hybrid surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Wei-bing**  **(2009)** | **Pre**  n = 39 | **Post**  1 week | 1.8 | **Pre**  n = 20 | **Post**  1 week | 1.8 | NC | NC | NC |
| 12.3 ± 2.9 | 14.1 ± 1.8 | 12.6 ± 2.8 | 14.4 ± 1.5 |
| **Post**  6 mos | 3.1 | **Post**  6 mos | 2.9 | NC | NC | NC |
| 15.4 ± 1.3 | 15.5 ± 1.1 |
| **Post**  12 mos | 3.3 | **Post**  12 mos | 3.0 | NC | NC | NC |
| 15.6 ± 1.4 | 15.6 ± 1.0 |
| **Post**  18 mos | 3.4 ± 2.07 | **Post**  18 mos | 2.9 ± 2.15 | 0.5 ± 1.34 | .39 | 0.374 |
| 15.7 ± 1.2 | 15.5 ± 0.9 |
| **Liu (Spine)**  **(2012)** | **Pre**  n = 39 | **Post**  26.1 mos | 3.9 ± 1.08 | **Pre**  n = 72 | **Post**  26.1 mos | 2.6 ± 1.20 | 1.3 ± 0.73 | <.0001 | 1.779 |
| 10.6 ± 1.4 | 14.5 ± 1.8 | 11.2 ± 1.9 | 13.8 ± 1.9 |
| **Liu (ESJ)**  **(2010)** | **Pre**  n = 87 | **Post**  3.6 years | 3.8 ± 1.87 | **Pre**  n = 96 | **Post**  3.6 years | 2.6 ± 1.70 | 1.2 ± 1.14 | <.0001 | 1.051 |
| 10.7 ± 3.1 | 14.5 ± 2.7 | 11.3 ± 2.5 | 13.9 ± 2.8 |
| **Liu (Zhejiang)**  **(2009)** | **Pre**  n = 16 | **Post**  17.3 mos | 3.4 ± 1.37 | **Pre**  n = 12 | **Post**  17.3 mos | 3.1 ± 0.50 | 0.3 ± 1.01 | .48 | 0.296 |
| 10.9 ± 1.8 | 14.3 ± 0.6 | 11.2 ± 0.8 | 14.3 ± 0.5 |
|  | 14.0 |  | 14.1 |

**†**Calculated by subtracting the mean change scores and dividing by the change score standard deviations. Positive scores indicate treatment favors anterior surgery.

NC = not calculable (standard deviations not reported)

**Visual Analog Scale for pain**

**Table 10. Studies comparing discectomy to corpectomy for CSM based on VAS scores at last follow up.**

|  | **Discectomy** | | | **Corpectomy surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Oh**  **(2009)** | **Pre**  n = 14 | **Post**  24.9 mos | -2.78 ± 1.8 | **Pre**  n = 17 | **Post**  27.3 mos | -0.06 ± 1.7 | -2.7 ± 1.1 | .0002 | -2.4 |
|  | 5.71 ± 3.0 | 2.93 ± 2.5 | 3.69 ± 2.9 | 3.63 ± 2.3 |
| **Song**  **(2012)** | **Pre**  n = 25 | **Post**  3 mos | -3.63 | **Pre**  n = 15 | **Post**  3 mos | -3.44 | -.07 ± 1.4 | .92 | -.05 |
| 6.84 ± 3.8 | 3.21 ± 2.7 | 5.97 ± 2.3 | 2.53 ± 2.3 |
| **Post**  87.3 mos | -3.08 ± 2.3 | **Post**  94.3 mos | -3.01 ± 1.6 |
| 3.76 ± 2.9 | 2.96 ± 2.7 |

\*\*Calculated by subtracting the corpectomy surgery change score from the discectomy surgery change scores.

**Sagittal alignment**

**Table 11. Studies comparing discectomy to corpectomy for CSM based on sagittal alignment scores.**

|  | **Discectomy** | | | **Corpectomy surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Lin**  **(2012)** | **Pre**  n = 57 | **Post**  24 mos | 7.96 ± 2.04 | **Pre**  n = 63 | **Post**  24 mos | 4.95 ± 1.8 | 3.01 | <.0001 | 2.432194 |
|  | 9.79 | 17.75 | 9.54 | 14.49 |
| **Liu**  **(2012)** | **Pre**  n = 69 | **Post**  26.1 mos | 12.4 ± 7.07 | **Pre**  n = 39 | **Post**  26.1 mos | 3.56 ± 7.68 | 8.84 | <.0001 | 1.880224 |
| 11.87 | 24.27 | 12.07 | 15.63 |
| **Oh**  **(2009)** | **Pre**  n = 14 | **Post**  24.9 mos | 2.93 ± 6.9 | **Pre**  n = 17 | **Post**  27.3 mos | -2.76 ± 6.8 | 5.69 | .95 | 1.312767 |
|  | 20.5 | 23.43 | 17.35 | 14.59 |
| **Song**  **(2012)** | **Pre**  n = 25 | **Post**  87.3 mos | 4.74 ± 3.35 | **Pre**  n = 15 | **Post**  94.3 mos | 2.89 ± 6.98 | 1.85 | .26 | 0.389677 |
| 2.47 | 7.21 | 1.04 | 3.93 |
| **Guo**  **(2009)** | **Pre**  n = 43 | **Post**  37.7 mos | 15.0 ± 8.09 | **Pre**  n = 24 | **Post**  37.3 mos | 2.7 ± 5.7 | 12.3 | <.0001 | 2.502612 |
| -0.1 | 14.9 | 8.7 | 11.4 |

\*\*Calculated by subtracting the corpectomy surgery change score from the discectomy surgery change scores.

**Table 12. Studies comparing discectomy to discectomy-corpectomy hybrid surgery for CSM based on sagittal alignment scores.**

|  | **Discectomy** | | | **Hybrid surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Liu**  **(2012)** | **Pre**  n = 69 | **Post**  26.1 mos | 12.4 ± 7.07 | **Pre**  n = 72 | **Post**  26.1 mos | 9.46 ± 6.63 | 2.94 | .01 | 0.675307 |
|  | 11.87 | 24.27 | 13.75 | 23.21 |
| **Guo**  **(2009)** | **Pre**  n = 43 | **Post**  37.7 mos | 15.0 ± 8.09 | **Pre**  n = 53 | **Post**  37.3 mos | 8.1 ± 5.22 | 6.9 | <.0001 | 1.376785 |
| -0.1 | 14.9 | 9.7 | 17.8 |

\*\*Calculated by subtracting the hybrid surgery change score from the discectomy surgery change scores.

**Table 13. Studies comparing corpectomy to discectomy-corpectomy hybrid surgery for CSM based on sagittal alignment scores.**

|  | **Corpectomy** | | | **Hybrid surgery** | | |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD\*)** | **Pre and post score**  **(mean ± SD)** | | **Change score**  **(mean ± SD)** | **Difference in**  **change scores\*\*** | **p-value** | **SMD†** |
| **Liu**  **(2012)** | **Pre**  n = 39 | **Post**  26.1 mos | 3.56 ± 7.68 | **Pre**  n = 72 | **Post**  26.1 mos | 9.46 ± 6.63 | -5.9 | <.0001 | -1.272882 |
| 12.07 | 15.63 | 13.75 | 23.21 |
| **Liu**  **(2009)** | Pre  n = 16 | Post  17.3 mos | 7.937 ± 8.89 | Pre  n = 12 | Post  17.3 mos | 6.917 ± 6.87 | 1.02 | .74 | 0.191009 |
| 5.063 | 13.0 | 3.75 | 10.667 |
| **Guo**  **(2009)** | **Pre**  n = 24 | **Post**  37.3 mos | 2.7 ± 5.7 | **Pre**  n = 53 | **Post**  37.3 mos | 8.1 ± 5.22 | -5.4 | .0001 | -1.54977 |
| 8.7 | 11.4 | 9.7 | 17.8 |

\*\*Calculated by subtracting the hybrid surgery change score from the corpectomy surgery change scores.

Table 14. Level of Evidence

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Methodological Principle** | **Guo**  **(2011)** | **Oh**  **(2009)** | **Hilibrand**  **(2002)** | **Lin**  **(2011)** | **Song**  **(2012)** | **Liu [Spine]**  **(2012)** | **Liu [ESJ]**  **(2010)** | **Liu [Zhejiang]**  **(2009)** | **Wei-bing**  **(2009)** | **Lian**  **(2010)** |
| Study design |  |  |  |  |  |  |  |  |  |  |
| Randomized controlled trial |  |  |  |  |  |  |  |  |  |  |
| Cohort Study | ⏹ | ⏹ | ⏹ | ⏹ | ⏹ | ⏹ | ⏹ | ⏹ | ⏹ | ⏹ |
| Case-series |  |  |  |  |  |  |  |  |  |  |
| Statement of concealed allocation† |  |  |  |  |  |  |  |  |  |  |
| Intention to treat† |  |  |  |  |  |  |  |  |  |  |
| Independent or blind assessment |  |  |  |  |  |  |  |  |  |  |
| Co-interventions applied equally |  |  |  |  |  |  |  |  |  |  |
| Complete follow-up of >85% |  |  |  |  |  |  |  |  | ⏹ | ⏹ |
| Adequate sample size | ⏹ | ⏹ | ⏹ | ⏹ | ⏹ | ⏹ | ⏹ |  | ⏹ | ⏹ |
| Controlling for possible confounding |  |  |  |  | ⏹ | ⏹ | ⏹ |  |  | ⏹ |
| Prospective study |  |  |  |  |  |  |  |  |  |  |
| **Evidence Level** | III | III | III | III | III | III | III | III | III | III |