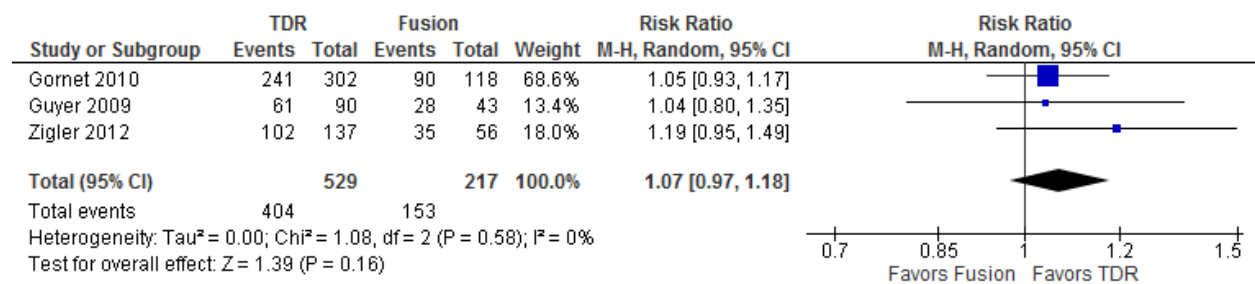


1.0 Supplementary Information

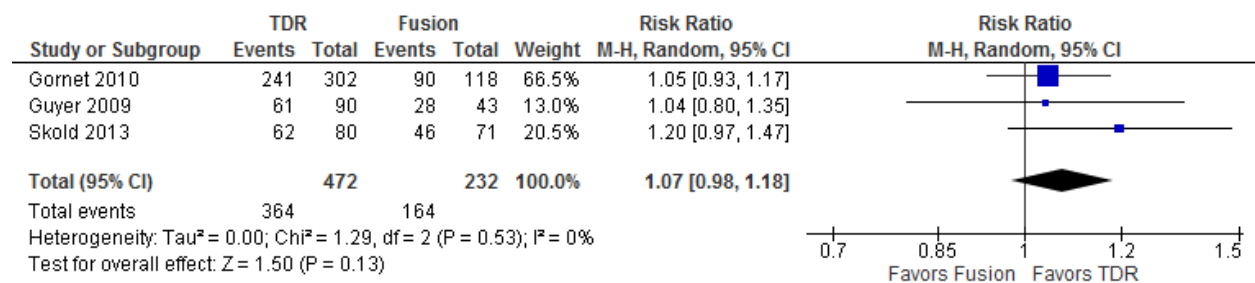
1.1 Supplementary Figures

Supplementary Figure S1. Excluding studies that used a different outcome definition or measure

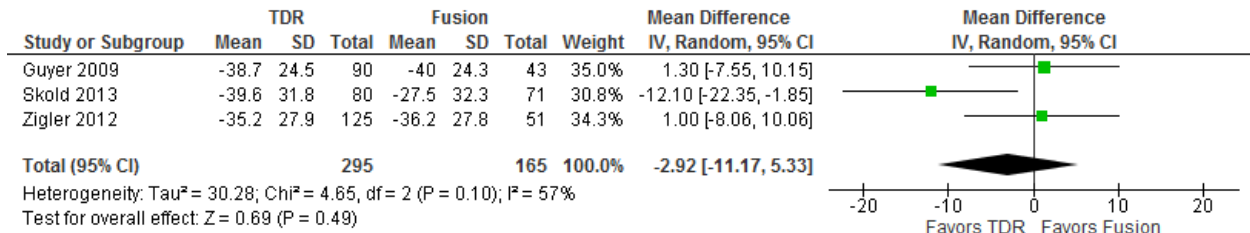
(A) ODI Success (≥ 15 -point improvement only)



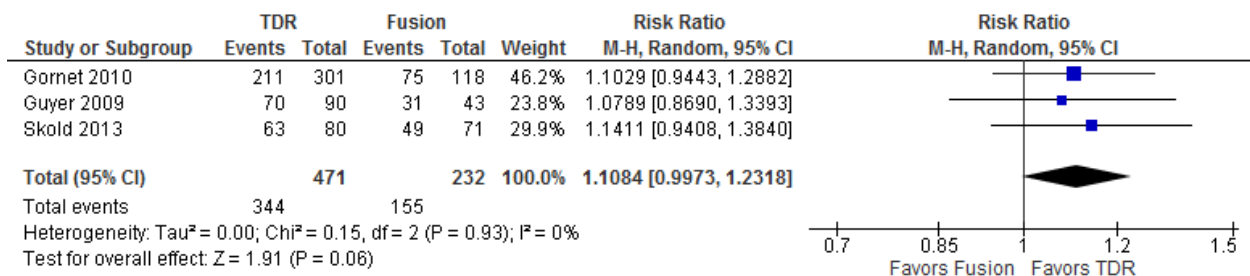
(B) ODI Success (ODI questionnaire v2.0 only)



(C) Back Pain Score (VAS only)

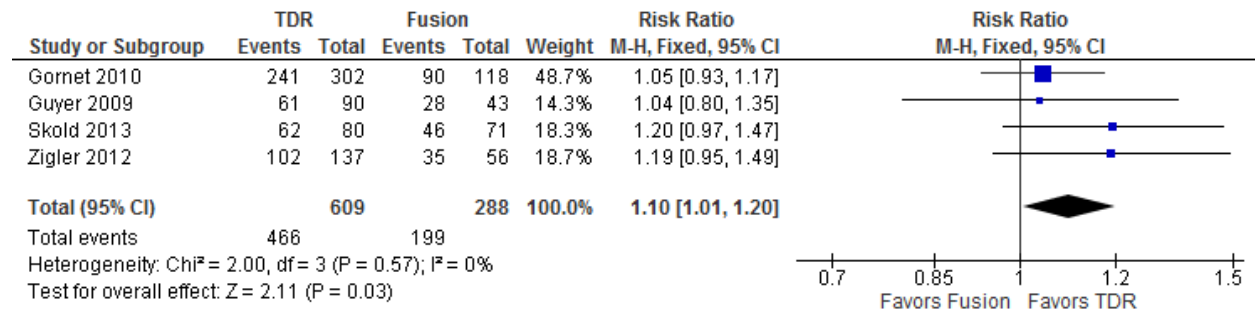


(D) Patient Satisfaction (exclusion of willingness to choose same surgery again)

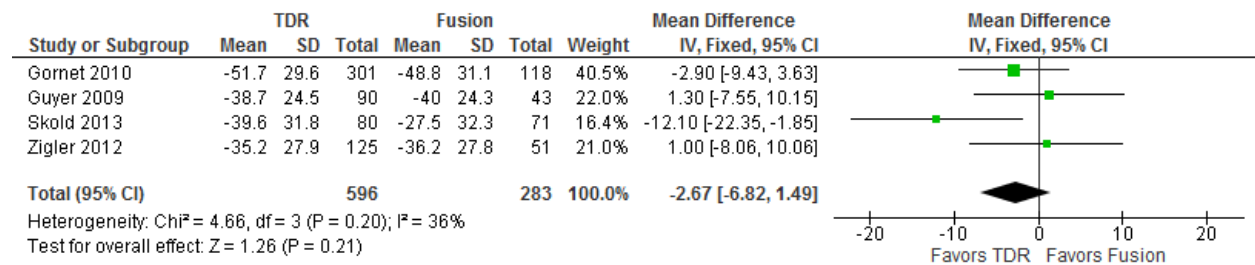


Supplementary Figure S2. Fixed-effects model

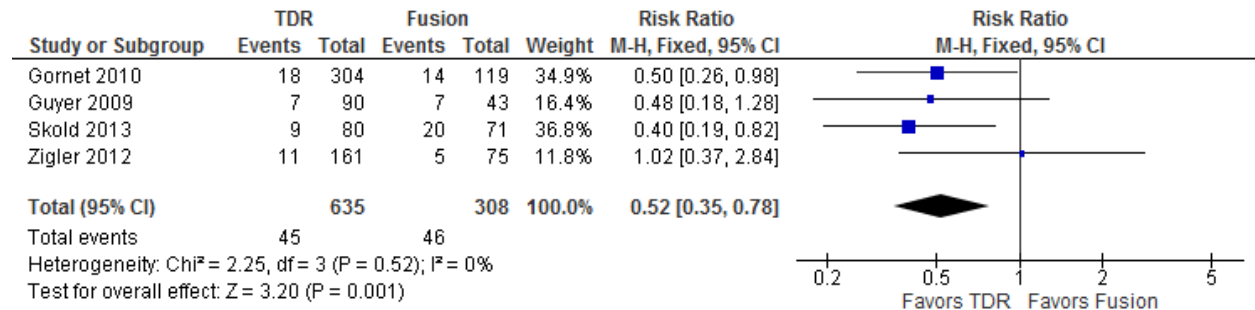
(A) ODI Success



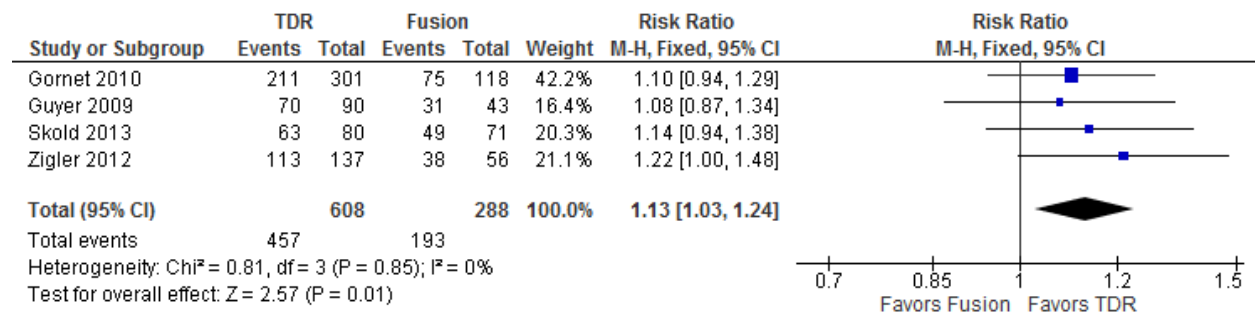
(B) Back Pain Score



(C) Reoperations

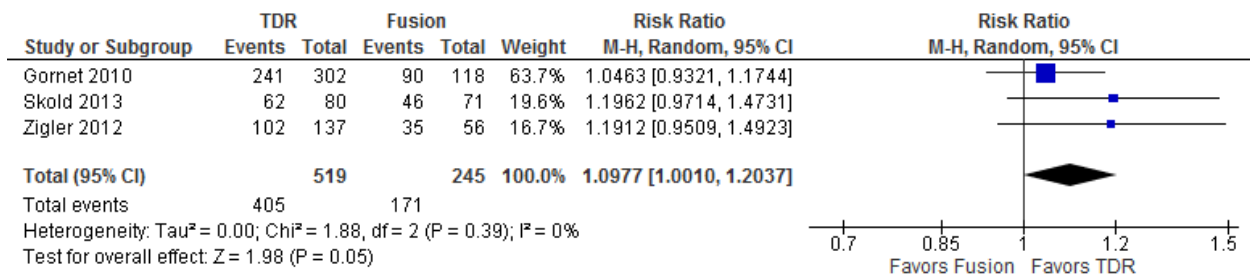


(D) Patient Satisfaction

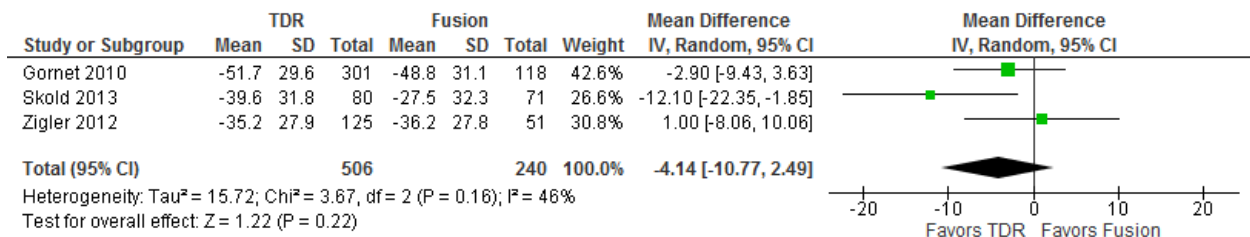


Supplementary Figure S3. Excluding studies with >30% loss to follow-up (Guyer 2009)

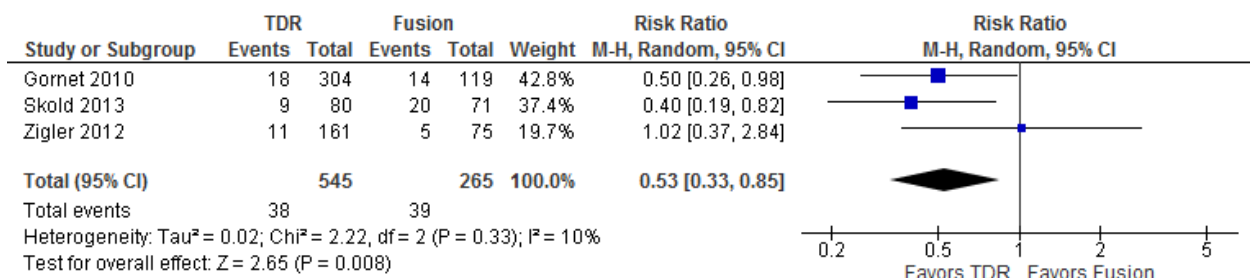
(A) ODI Success



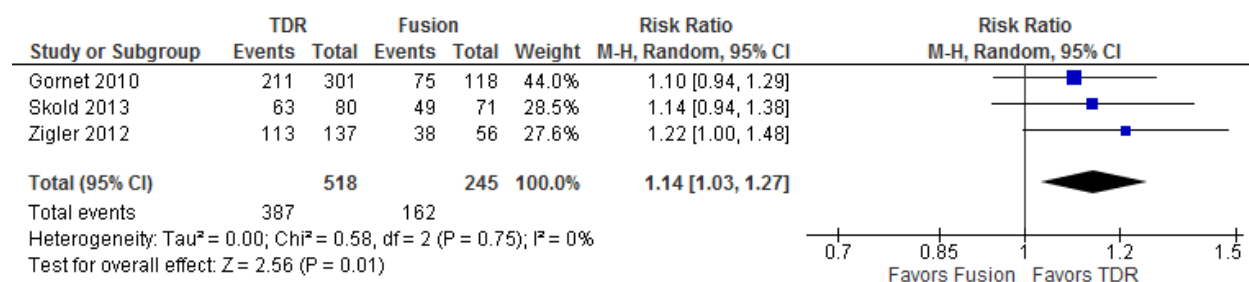
(B) Back Pain Score



(C) Reoperations



(D) Patient Satisfaction



1.2 Supplementary Tables

Supplementary Table S1: Literature Search Strategy and Search Terms

Search #1

1	"degenerative disc disease" OR "degenerative disc disease ddd" OR "degenerative disc diseases" OR "degenerative disc lesions" OR "degenerative disc surgery" OR "degenerative discopathies" OR "degenerative discopathy" OR "degenerative discs" OR "degenerative disk" OR "degenerative disk disease" OR "degenerative disk diseases" OR "degenerative disk lesions" OR "degenerative diskopathy" OR "degenerative disks"
2	"degenerative human intervertebral" OR "degenerative human intervertebral disc" OR "degenerative intervertebral disc" OR "degenerative intervertebral disc disease" OR "degenerative intervertebral discs" OR "degenerative intervertebral disk" OR "degenerative intervertebral disk diseases" OR "degenerative intervertebral disks" OR "degenerative intervertebral lumbar" OR "degenerative intervertebral lumbar disc" OR "degenerative lumbar disc" OR "degenerative lumbar disc disease" OR "degenerative lumbar disc diseases" OR "degenerative lumbar discs" OR "degenerative lumbar disk" OR "degenerative lumbar disk disease" OR "degenerative lumbar intervertebral" OR "degenerative lumbar intervertebral disc" OR "degenerative lumbar intervertebral discs" OR "degenerative lumbar intervertebral instability"
3	1 or 2
4	"arthrodesis" OR "arthrodesis/economics" OR "arthrodesis/rehabilitation" OR "arthrodesis/utilization" OR "arthrodesis surgeries" OR "arthrodesis surgery" OR "arthrodesis surgical"
5	"total disc replacement" OR "total disc replacement/adverse effects" OR "total disc replacement/economics" OR "total disc replacement/instrumentation" OR "total disc replacement/utilization" OR "total disc replacement device" OR "total disc replacement devices" OR "total disc replacement implant" OR "total disc replacement surgeries" OR "total disc replacement surgery" OR "total disc replacements"
6	4 or 5
7	"surgical fusion" OR "surgical fusions"
8	6 or 7
9	"management" OR "treatment"
10	8 or 9
11	"pain management" OR "pain management/economics"

12	10 or 11
13	"lumbar interbody fusion" OR "lumbar interbody fusion devices"
14	"anterior lumbar interbody fusion" OR "anterior lumbar interbody fusion procedure" OR "anterior lumbar interbody fusion procedures" OR "anterior lumbar interbody fusion surgery" OR "anterior lumbar interbody fusions" OR "anterior lumbar interbody spinal fusion" OR "anterior lumbar interbody surgery" OR "anterior lumbar intervertebral" OR "anterior lumbar intervertebral fusion"
15	13 or 14
16	"posterior lumbar interbody fusion" OR "posterior lumbar interbody fusion plif" OR "posterior lumbar interbody fusion procedure" OR "posterior lumbar interbody fusion procedures" OR "posterior lumbar interbody fusion surgery" OR "posterior lumbar interbody fusions" OR "posterior lumbar intervertebral" OR "posterior lumbar intervertebral fusion"
17	15 or 16
18	12 or 17
19	"rehabilitation" OR "rehabilitation/economics" OR "rehabilitation/employment" OR "rehabilitation/exercise" OR "rehabilitation/exercise training" OR "rehabilitation/pain" OR "rehabilitation/physical therapy" OR "rehabilitation/physiotherapy" OR "rehabilitation/recovery" OR "rehabilitation/rehabilitation"
20	18 or 19
21	physiotherapy" OR "physiotherapy/exercise" OR "physiotherapy/rehabilitation" OR "physiotherapy/therapeutic" OR "physiotherapy and 2surgical" OR "physiotherapy and 2surgical and" OR "physiotherapy and 2surgical and perioperative" OR "physiotherapy and 2surgical and perioperative sciences"
22	20 or 21
23	3 and 22
24	("2000/01/01"[PDAT] : "2015/12/31"[PDAT]) AND "humans"[MeSH Terms] AND English[lang]
25	23 and 24

Search #2

1	"degenerative disk disease" OR "degenerative disk diseases" OR "degenerative disk lesions" OR "degenerative disk material" OR "degenerative disks" OR "degenerative human intervertebral" OR "degenerative human intervertebral disc"
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2	"intervertebral disc degeneration"
3	1 or 2
4	intervertebral disc disease" OR "lumbar disc degeneration"
5	3 or 4
6	arthrodesis" OR "total disc replacement" OR "surgical fusion" OR "management" OR "treatment" OR care OR "fusion" OR "surgery" OR "anterior lumbar interbody fusion" OR "posterior lumbar interbody fusion" OR "pain management" OR "rehabilitation" OR "physical therapy"
7	"2000/01/01"[PDAT] : "2015/12/31"[PDAT]
8	"humans"[MeSH Terms] AND English[lang]
9	7 and 8
10	5 and 6 and 9

Supplementary Table S3: PRISMA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	3-4
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	7
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	7
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	-
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	8
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	7,9
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	42-44
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	7-8
Data collection	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any	9-10

process		processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	9-10
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	10-11
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	11
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	11
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	10-11
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	12
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	12, 30
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	13, 34
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	13-14, 31, 36-41
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	32-33, 35
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	14-16, 32-33
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	NA
Additional	23	Give results of additional analyses, if done (e.g., sensitivity or	16-17,

analysis		subgroup analyses, meta-regression [see Item 16]).	36-41
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	17, 21-22
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	20-21
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	18-20, 22
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	23

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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