The ODI (Oswestry Disability Index): perceptions of the inventor

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History

• 2 types of outcome measures:
  – Condition specific
  – General
History

• **Condition specific**
  - Oswestry Disability Index (ODI) 1980
  - Roland Morris Disability Questionnaire (RMDQ) 1983
  - Core Outcome Measures Index (COMI) 1998
  - and 82 others!

• **General**
  - SF-36
  - EuroQol
  - and ∞ others!

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What is the use of ODI?

• Internationally recognised **Gold Standard**
• Self–report disability assessment (baseline)
• Helps to categorise a study group
• Many validations
• Correlates with other disability and pain measures
  – condition specific
  – general
• Measure of change
• No ceiling effect
• Best for **high** disability back pain
• Best for **low** disability back pain?
Preamble

• This questionnaire is designed to give us information as to how your back (or leg) trouble affects your ability to manage in everyday life.

• Please answer every section. Mark one box only in each section that most closely describes you today.
ODI version 2.1a

Section 1  - Pain intensity
Section 2  - Personal care (washing, dressing, etc.)
Section 3  - Lifting
Section 4  - Walking
Section 5  - Sitting
Section 6  - Standing
Section 7  - Sleeping
Section 8  - Sex life (if applicable)
Section 9  - Social life
Section 10 - Travelling
Section 1 - Pain intensity

- I have no pain at the moment.
- The pain is very mild at the moment.
- The pain is moderate at the moment.
- The pain is fairly severe at the moment.
- The pain is very severe at the moment.
- The pain is the worst imaginable at the moment.
Section 2 - Personal care (washing, dressing, etc.)

- I can look after myself normally without causing extra pain.
- I can look after myself normally but it is very painful.
- It is painful to look after myself and I am slow and careful.
- I need some help but manage most of my personal care.
- I need help every day in most aspects of self care.
- I do not get dressed, wash with difficulty and stay in bed.
Section 3 - Lifting

- I can lift heavy weights without extra pain.
- I can lift heavy weights but it gives extra pain.
- Pain prevents me from lifting heavy weights off the floor but I can manage if they are conveniently positioned, e.g. on a table.
- Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.
- I can lift only very light weights.
- I cannot lift or carry anything at all.
Section 4 - Walking

- Pain does not prevent me walking any distance.
- Pain prevents me walking more than one mile (1 Kilometre).
- Pain prevents me walking more than a quarter of a mile (500 metres).
- Pain prevents me walking more than 100 yards (100 metres).
- I can only walk using a stick or crutches.
- I am in bed most of the time and have to crawl to the toilet.
Section 5 - Sitting

- I can sit in any chair as long as I like.
- I can sit in my favourite chair as long as I like.
- Pain prevents me from sitting for more than 1 hour.
- Pain prevents me from sitting for more than half an hour.
- Pain prevents me from sitting for more than 10 minutes.
- Pain prevents me from sitting at all.
Section 6 - Standing

- I can stand as long as I want without extra pain.
- I can stand as long as I want but it gives me extra pain.
- Pain prevents me from standing for more than 1 hour.
- Pain prevents me from standing for more than half an hour.
- Pain prevents me from standing for more than 10 minutes.
- Pain prevents me from standing at all.
Section 7 - Sleeping

- My sleep is never disturbed by pain.
- My sleep is occasionally disturbed by pain.
- Because of pain I have less than 6 hours sleep.
- Because of pain I have less than 4 hours sleep.
- Because of pain I have less than 2 hours sleep.
- Pain prevents me from sleeping at all.
Section 8 - Sex life (if applicable)

- My sex life is normal and causes no extra pain.
- My sex life is normal but causes some extra pain.
- My sex life is nearly normal but is very painful.
- My sex life is severely restricted by pain.
- My sex life is nearly absent because of pain.
- Pain prevents any sex life at all.
Section 9 - Social life

- My social life is normal and causes me no extra pain.
- My social life is normal but increases the degree of pain.
- Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g. sport, etc.
- Pain has restricted my social life and I do not go out as often.
- Pain has restricted social life to my home.
- I have no social life because of pain.
Section 10 - Travelling

- I can travel anywhere without pain.
- I can travel anywhere but it gives extra pain.
- Pain is bad but I manage journeys over two hours.
- Pain restricts me to journeys of less than one hour.
- Pain restricts me to short necessary journeys under 30 minutes.
- Pain prevents me from travelling except to receive treatment.
0% = no disability - “normal”

100% = total disability
ODI as a baseline assessment
In 1980 we suggested...

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Disability Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20%</td>
<td>Minimal Disability</td>
</tr>
<tr>
<td>20-40%</td>
<td>Moderate Disability</td>
</tr>
<tr>
<td>40-60%</td>
<td>Severe Disability</td>
</tr>
<tr>
<td>60-80%</td>
<td>Crippled</td>
</tr>
<tr>
<td>80-100%</td>
<td>Exaggerating or Bedbound</td>
</tr>
</tbody>
</table>
In 2000 we reviewed >300 citations

ODI as a measure of change
2 year f/u data from MRC Spine Stabilisation Trial 2005

ODI Total Score 24 months vs. ODI Total Score Baseline

- Worse outcomes for patients with higher baseline scores.
- Better outcomes for patients with lower baseline scores.

Trial Allocation:
- Rehabilitation
- Surgery

Graph shows distribution of outcomes with markers indicating trials allocation.
Some competitors...

• Core Outcome Measures Index (COMI)
• Roland Morris Disability Questionnaire
Core Outcome Measures Index

• Standardized set of outcome measures for use in patients with back pain was proposed by a multinational group of experts

  
  doi: 10.1097/00007632-199809150-00018
Core Outcome Measures Index
Used in SPINE Tango

• The COMI has one question each on
  – back (neck) pain intensity,
  – leg/buttock (arm/shoulder) pain intensity,
  – Function
  – symptom-specific well being
  – general quality of life
  – work disability
  – social disability

• scored as a 0–10 index
COMI

• Standard outcome for Spine Tango
• Needs to be completed in full
Roland Morris Disability Questionnaire
http://www.rmdq.org/


• Selected questions from Pain Disability Index

• Does this apply to you now? yes
  – Score 0-24
  – Only scores marked questions ?missing data
  – Widely used
  – Advocated for primary care settings
ODI vs RMDQ
Scatter plot of simultaneous Oswestry Disability Index vs Roland-Morris Index scores
In a group of 100 back pain patients (via computer interview)
Scatter plot of simultaneous Oswestry Disability Index vs Roland-Morris Index scores
In a group of 100 back pain patients (via computer interview)
Scatter plot of simultaneous Oswestry Disability Index vs Roland-Morris Index scores in a group of 100 back pain patients (via computer interview)
Is RMQ better than ODI for low disability studies in primary care?

Frost H, Lamb S, Stewart Brown S.

Responsiveness of a patient specific outcome measure compared with the Oswestry Disability Index V2.1 and the Roland and Morris Disability Questionnaire for patients with sub-acute and chronic low back pain.

Responsiveness of a Patient Specific Outcome Measure Compared With the Oswestry Disability Index v2.1 and Roland and Morris Disability Questionnaire for Patients With Subacute and Chronic Low Back Pain
Surgical treatment of back pain – Baseline ODI scores
Surgical treatment of back pain

55%

40%
Surgical treatment of back pain

55%

40%
Zigler, J; Delamarter, R; Spivak, J; Linovitz, RJ; Danielson, GO; Haider, TT; Cammisa, F; Zuchermann, J; Balderston, R; Kitchel, S; Foley, K; Watkins, R; Bradford, D; Yue, J; Yuan, H; Herkowitz, H; Geiger, D; Bendo, J; Peppers, T; Sachs, B; Girardi, F; Kropf, M; Goldstein, J.

**Results of the Prospective, Randomized, Multicenter Food and Drug Administration Investigational Device Exemption Study of the ProDisc(R)-L Total Disc Replacement Versus Circumferential Fusion for the Treatment of 1-Level Degenerative Disc Disease.**

*Spine 2007;32(11):1155-1162*
Section 10—Changing degree of pain
My pain is rapidly getting better.
My pain fluctuates but overall is definitely getting better.
My pain seems to be getting better but improvement is slow at present.
My pain is neither getting better or worse.
My pain is gradually worsening.
My pain is rapidly worsening.
Rasch analysis of three versions of the Oswestry Disability Questionnaire

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Abstract

The purpose of the study was to explore the construct validity of three versions of the Oswestry Disability Questionnaire for low back pain using Rasch analysis. The three versions of the ODQ share 9 items and differ on one other. About 100 patients with non-specific low back pain seeking physiotherapy treatment at hospital outpatient departments and physiotherapy private practices completed the 12 Oswestry items as part of a battery of questionnaires. Rasch analysis revealed that four items (Personal Care, Standing, Sex Life and Social Life) had disordered response thresholds and one item (Walking) showed differential item functioning by age. The 10 standard Oswestry items and a modified version in which Sex Life is replaced by Work/Housework showed adequate overall fit to the Rasch model ($\chi^2 P > .01$). The third version, in which Sex Life is replaced...
Use and Abuse of Oswestry Disability Index

Jeremy C. T. Fairbank, MD, FRCs

Readers of this journal are well aware of the difficulties we have in measuring clinical outcomes in back pain research. The instruments we have are flawed despite the sterling efforts of many investigators. Although it is essential to continue to develop improved outcome measures, it is important to care for the ones we have in active use. The Oswestry Disability Index (ODI) was first published 27 years ago. Since then it has become one of the leading condition-specific outcome measures in back pain research and clinical practice. In that time, like most such outcome instruments, various modifications have been made. It has been used on a similar basis to computer "fireware." The original authors have only sought a royalty when it has been sold as part of a marketed package. As lead author of the original publication, I have tried to keep it clean and reliable. Many studies have been published comparing it to other instruments and investigating its reliability. It has been translated into many languages, and these translations have led to further validation studies. I have listed all the available versions in English and translations on a website: http://www.orthospire.org.uk/odi/

In 1988, I performed a citation review of the use of ODI, which led to a publication with Paul Pynsent. This included what we called ODI (v1.0), which had a modification of the pain question (Q1) and clarification of the wording of other sections developed for a trial by the MRC in 1984. A typographical error in the traveling section was exposed and v2.1 was born (actually the version we had been using since 1986). A group of translators suggested a single word change in the introductory statement for the sake of clarity (v2.1a — see website). This reflects a careful and measured evolution the instrument to meet modern psychometric criteria.

Unfortunately, an alternative version was developed at the Anglo-European Chiropractic College. They changed wording in all the questions. They substituted the sex question (Q8) with a symptom change question that is quite outside the original conception of the instrument. This questionnaire has been used by chiropractors but never validated. It was my mistake to allow the use of the term "revised Oswestry Pain Questionnaire" and I now consider this to be in breach of the copyright held by the authors of the original publication.

I was not aware of any major study where this chiropractic version has been used, until the FDA Device Exemption Study of the ProDisc-L Total Disc Replacement was published this year. Their use of this questionnaire has demonstrated why care with instruments is so important. There are 4 main issues:

Validation. Zigler's response 45 at the end of this edition of SPINE would suggest that quoting a reference from an unreferenced book (that readers will only be able obtain with the greatest difficulty), quoting no validation studies, and stating that the chiropractic questionnaire is "essentially the same," seems to fly in the face of the obsessive work of investigators, referees and editors to get ODI and other outcome measures as refined as possible.

Version Numbers. Zigler et al's publication does not indicate which version of the "Oswestry Disability Index" was used. It is not alone. It is essential that investigators indicate the version number of an instrument in publications and that this practice is enforced by editors and referees.

The Baseline Score. In a population with chronic back pain considered suitable for surgery, the chiropractic instrument generates a mean 10-15 points higher than other similar studies using the validated versions of the ODI. The confidence intervals do not overlap those of other studies (Figure 1, calculated by P. Pynsent) and 10 points higher than the previous record in a ODI (v1.0) (in 2 studies of patients with spinous metastases, Figure 2, reproduced from Fairbank and Pynsent). These high scores might also suggest a study drawn from a different population, but I think this is unlikely. The ProDisc[RL]-L Study used the ODI (Chiropractic version) score 40 as part of the entry criteria. The Chariot study used ODI (v1.0) > 30.29 In our spinal fusion trial, where we used ODI (v2.1), we stratified patients for randomisation above and below ODI scores of 40, but did not use ODI as an entry criteria. The differences in ODI threshold between the 3 disc replacement trials, Zigler quotes are meaningless when 2 different instruments have been used.

Change Score. Use of the chiropractic version leads to an exaggeration of the treatment effect when compared with other studies, and enhances the proportion of patients meeting externally set criteria, such as those set by...
To the Editor:


The terms back pain and disc degeneration are commonly used as though they are interchangeable. The study by Virtanen et al provides such an example, including the confusion that predictably results. The object of their study was “intervertebral disc disease,” also referred to in this study as “IDD.” Yet, IDD as related to specific symptoms is largely theoretical. The term IDD does not have a universally accepted definition, nor is it clearly measurable. Nachemson recently concluded “We still do not have diagnostic techniques that can link structural abnormalities to symptoms with any accuracy.” Use of the term IDD when, in fact, measuring self-reports of back and leg symptoms only muddles the waters when interpreting results.

Virtanen’s study compared histories of back pain and presumed “sciatia” in train engineers to a control group without exposure to occupational driving. The authors noted that their findings differed from the results of the study by Bardić et al comparing monozygotic twin siblings, who were greatly discordant for lifetime occupational driving, where no significant differences were observed in quantitative disc signal, annular tears, bulging, or disc height narrowing based on MRI. Herniations were more prevalent among nondriver. The findings of Virtanen et al neither contradict nor support these results. Virtanen et al in this work studied back-related symptoms and Bardić et al studied MRI findings associated with disc degeneration.

Remarkably, a second study by Kuisma et al, published in the same issue of Spine, including some of the same investigators as in the Virtanen study and using similar, if not the same, train engineers and controls subjects, examined associations among occupational, back pain, and MRI findings. They did not find an association between occupational exposure and the specific MRI findings (Modic changes) that they found correlated best with back pain. These findings could be interpreted as adding support to others’ findings of an absence of association between driving and associated vibration and findings of disc degeneration and pathology.

It may be that imprecise pathologic diagnoses and case definitions in this field are clouding our interpretation of available research.

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Stanford, CA

Reference

In Response

We thank Michele Bardić, Tapio Videen, and Eugene Carragee for their interest in our paper1 and for raising an important topic of discussion in Spine. We fully agree that intervertebral disc disease (IDD) as related to specific symptoms is largely theoretical. We also agree that the overall terminology used in this field of research is imprecise, and that there is a definite need for clearer definitions and concepts. However, as long as no well-defined and universally accepted “vocabulary” exists for low back and sciatic disorders, a case definition must be operationalized separately for each report. Consequently, the terminology in each paper must be interpreted with caution and direct comparisons are rarely possible.

In the study by Virtanen et al, IDD was defined with the aid of latent class clustering on the basis of recurrent,
Abschnitt 10 - Reisen/Fahrten

- Ich kann überallhin reisen, ohne Schmerzen zu bekommen.
- Ich kann überallhin reisen, aber die Schmerzen werden dadurch stärker.
- Trotz starker Schmerzen kann ich länger als 2 Stunden unterwegs sein.
- Ich kann auf Grund von Schmerzen höchstens 1 Stunde unterwegs sein.
- Ich kann auf Grund von Schmerzen nur kurze notwendige Fahrten unter 30 Minuten machen.
- Schmerzen hindern mich daran, Fahrten zu machen, außer zur medizinischen Behandlung.
~44 translations of variable validity

Planned MAPI translations

- Arabic for Kuwait
- Czech
- English for Australia
- English for Singapore
- English for Canada
- Dutch for Belgium
- Dutch for the Netherlands
- German for Austria
- German for Switzerland
- Hebrew
- Korean for South Korea
- Mandarin Chinese for Singapore
- Polish
- Portuguese for Portugal
- Slovak
Please do not use Rogue ODI’s

• Chiropractic
• “modified” etc etc
• Poor translations
What is Normal???

• Using ODI to establish normality...
“Normal” ODI scores collected by Fairbank & Pynsent

‘Normal’ healthy populations (n=461) have an ODI mean score of 10 (SD 2-12)

- “Successful Treatment” was defined as having at one year follow-up <22 points on the ODI,
- (mean + 2 SD)
- Miranda van Hooff, Nijmegen, Netherlands
Functional status as measured with the ODI (0-100) in the RealHealthNL study sample (n=524).
What is success?
An alternative analysis

• Current method:
  – Achievement of a given change-score, e.g. a 15-point reduction on a 0-100-scaled instrument

• BUT achievement of such a change
  • 1) depends on the initial preoperative score
  • 2) does not indicate whether a satisfactory symptom state is ultimately reached

• Material
  – 532 patients undergoing lumbar spine surgery in Oxford
  – ODI and the Core Measures Outcome Index (COMI) at various times up to 4y after surgery

• “if you had to spend the rest of your life with the symptoms you have right now, how would you feel about it?”
  – 5-point Likert scale from “very satisfied” to “very dissatisfied”.
What is Normal???
Receiver Operating Characteristics (ROC)

- Two analyses were used to derive cut-off scores for ODI that best predicted being 1) “satisfied” and 2) “very satisfied” with the symptom state.

<table>
<thead>
<tr>
<th>Numbers of Patients</th>
<th>ROC area under the curve</th>
<th>95% CI</th>
<th>ODI-score cut-off</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>“≥satisfied”</td>
<td>114/532 (21%)</td>
<td>0.89</td>
<td>0.86-0.92</td>
<td>≤ 29</td>
<td>88%</td>
</tr>
<tr>
<td>“very satisfied”</td>
<td>43/532 (8%)</td>
<td>0.94</td>
<td>0.92-0.96</td>
<td>≤ 14</td>
<td>86%</td>
</tr>
</tbody>
</table>
In 1980 we suggested...

0-20% Minimal Disability
20-40% Moderate Disability
40-60% Severe Disability
60-80% Crippled
80-100% Exaggerating or Bedbound
Copyright holders have licensed MAPI to care for ODI
• No cost to clinical users, but do need to sign agreement
• Some costs for publication and for commercial users.
• Check MAPI Trust website for correct versions and translations
• Currently there are >44 translations, but few of these have been approved by MAPI yet
• MAPI PROinformation@mapi-trust.org
• Use version ODI v2.1a
• Other websites/translations
  – Are considered to be in breach of copyright