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**Rehabilitation goals of people with spinal cord injuries can be classified against the International Classification of Functioning, Disability and Health Core Set for spinal cord injuries**

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## Classifying patient goals against ICF Core Sets for SCI

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8 Rehabilitation goals of people with spinal cord injuries can be  
9 classified against the International Classification of Functioning,  
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Classifying patient goals against ICF Core Sets for SCI

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34

Classifying patient goals against ICF Core Sets for SCI

35 Rehabilitation goals of people with spinal cord injuries can be  
36 classified against the International Classification of Functioning,  
37 Disability and Health Core Set for spinal cord injuries

38

39 **Abstract**

40

41 **Study design:** Cross-sectional study

42 **Objectives:** To establish if inter-professional rehabilitation goals from  
43 people with non-traumatic spinal cord injury (SCI) can be classified  
44 against the International Classification of Functioning, Disability and  
45 Health (ICF) SCI comprehensive and brief Core Sets early post-  
46 acute situation

47 **Setting:** Neurological rehabilitation unit

48 **Methods:** Rehabilitation goals of 119 patients with mainly incomplete  
49 and non traumatic spinal cord injuries were classified against the ICF  
50 SCI Core Sets following established linking rules

51 **Results:** 119 patients generated 1509 goals with a mean (and  
52 Standard Deviation, SD) of 10.5 (9.1) goals per patient during the  
53 course of their inpatient rehabilitation stay. Classifying the 1509  
54 rehabilitation goals against the Comprehensive ICF Core Set  
55 generated 2909 ICF codes. Only 69 goals (4.6%) were classified as  
56 'Not definable (ND)'. Classifying the 1509 goals against the Brief ICF  
57 Core Set generated 2076 ICF codes. However, 751(49.8%) of these  
58 goals were classified as 'Not definable (ND)'. In the majority of  
59 goals (95.7%) the ICF code description was not comprehensive

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60 enough to fully express the goals set in rehabilitation. In particular  
61 the notion of quality of movement or specificity and measurability  
62 aspects of a goal (usually described with the criteria and acronyms  
63 SMART) could not be expressed through the ICF codes.

64 Conclusions: Inter-professional rehabilitation goals can be broadly  
65 described by the ICF comprehensive Core Set for SCI but not the  
66 Brief Core Set.

67

### 68 **Key words**

69 Spinal Cord injury, International Classification of Functioning

70 Disability and Health, ICF, rehabilitation, goal setting

71

72

73 **Introduction**

74

75 Spinal cord injuries may have profound effects on the physical  
76 functioning of an individual and cause activity limitations and  
77 participation restrictions <sup>1</sup>. The level of lesion and degree of  
78 neurological completeness/incompleteness influences the physical  
79 ability following a spinal lesion, but quality of life in SCI is largely  
80 determined by activity and participation issues such as personal care,  
81 community transportation and stable relationships <sup>2</sup>. The ability to  
82 describe, classify and code information and measurements on such a  
83 broad range of health issues requires a common framework and  
84 language. The World Health Organisation endorsed the ICF as a  
85 member of the family of international classifications and was  
86 designed to provide such a framework; it aimed to 'establish a  
87 common language for describing health related states in order to  
88 improve communication<sup>3 (p3)</sup>. The ICF understands human  
89 functioning to be the result of complex interactions between health  
90 conditions and environmental and personal factors.

91 Whilst the ICF is intended to be a document for use in clinical  
92 practice, its length and complexity make this a practical challenge.  
93 Tailored useful applications have therefore emerged and continue to  
94 be under development; the ICF should therefore be seen as a living  
95 tool <sup>4</sup>. The need for such tailoring has led to the creation of  
96 condition specific Core Sets <sup>5</sup> which aim to contain a practically

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97 useful number of ICF codes which are comprehensive enough to  
98 cover the range of health issues relevant to a particular condition.  
99  
100 Core Comprehensive and Brief Sets for individuals with SCI have  
101 been developed for the early post-acute <sup>6</sup> and the long-term  
102 situations <sup>7</sup>. The Comprehensive early post-acute Core Set consists  
103 of 162 ICF codes of which 63 are from 'body functions', 14 from  
104 'body structures', 53 from 'activities and participation' and 32 from  
105 'environmental factors'. The Brief Set consists of 26 codes with 8  
106 from 'body functions', 3 from 'body structures', 9 from 'activities and  
107 participation' and 5 from 'environmental factors'. The Comprehensive  
108 Core Set has been validated for use by physiotherapists as well as  
109 occupational therapists who found that this Set covered the majority  
110 of patient problems they encountered <sup>8 9</sup>. More recently Chen et al.  
111 <sup>10</sup> developed an alternative Core Set as they felt that the existing  
112 ones were too influenced by western values and were not fully  
113 applicable to people from Asia who were seen as being more  
114 conservative and having closer family relationships.  
115  
116 Goal setting, defined as 'the formal process whereby a rehabilitation  
117 professional or team together with the patient and/or their family  
118 negotiate goals' <sup>11</sup> is widely practiced in rehabilitation settings even  
119 though its effectiveness has so far eluded formal unequivocal  
120 confirmation <sup>12</sup>. The process of goal setting has been described as  
121 complex and frequently dominated by the professionals in the team <sup>13</sup>.

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122 Challenging and yet achievable goals, frequently described with the  
123 acronym SMART (Specific, Measurable, Achievable, Relevant and  
124 Timed), have the potential to maximise the goal setting process <sup>14</sup>.  
125 Attempts to classify patient goals against the ICF within the acute  
126 and post-acute general rehabilitation settings have concluded that  
127 they broadly map against ICF domains <sup>15,16</sup>. Wallace et al. <sup>17</sup> found  
128 that the goals of people with SCI are represented by the ICF,  
129 although they did not actually classify these goals against the Core  
130 SCI Sets. The aim of this study was therefore to specifically classify  
131 inter-professional rehabilitation goals from people with mostly non-  
132 traumatic and incomplete SCI against the ICF SCI comprehensive  
133 and brief Core Sets.

134

135

136

### 137 **Methods**

138

139 This study utilised anonymised data from a clinical database of  
140 1458 patients admitted to an inpatient neuro-rehabilitation unit. The  
141 database <sup>18</sup> contained diagnostic information, gender, age, length of  
142 stay, admission and discharge destination, rehabilitation goals and  
143 standardised clinical outcome measures (Barthel Index, Functional  
144 Independence Measure) of 1458 patients with a variety of  
145 neurological conditions admitted consecutively over a 13 year period.

146



## Classifying patient goals against ICF Core Sets for SCI

147 From this database we extracted the information of all 119 patients  
148 with a diagnosis of 'spinal cord injury' and classified their  
149 rehabilitation goals against the ICF SCI comprehensive and brief  
150 Core Sets. The rehabilitation goals are developed by the multi-  
151 disciplinary team in partnership with the patient, at weekly meetings.  
152 The process of goal planning broadly follows the principles described  
153 previously by others<sup>19,20</sup> and involve the agreement of relevant goals  
154 which are measurable, achievable, and can be expressed in  
155 behavioural terms. These short and long term goals are  
156 reviewed on a two or three weekly basis and the outcome of a goal is  
157 documented as either 'Achieved', 'Not achieved', 'Ongoing', 'Goal  
158 revised' or 'Goal abandoned'.

159

160 Classification of the goals followed the linking rules recommended by  
161 Cieza et al.<sup>21</sup> involving the following steps:

- 162 • Prior to classification the researchers developed good  
163 knowledge of the conceptual and taxonomical fundamentals of  
164 the ICF, as well as of the chapters, domains, and categories of  
165 the detailed classification, including definitions.
- 166 • Each individual goal was carefully inspected and analysed to  
167 ascertain the overall goal and divide the overall goal into a  
168 primary goal, a secondary goal aspect and a tertiary goal  
169 aspect as appropriate. For example the overall goal "To walk  
170 to local shop, to purchase a newspaper" was divided into the

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- 171 primary goal 'To walk to local shop', and the secondary goal  
172 aspect 'to purchase a newspaper'.
- 173 • Each primary, secondary and tertiary goal was then classified  
174 against the Comprehensive ICF Core Set for SCI – early post-  
175 acute situation as well as the Brief ICF Core Set for SCI –  
176 early post-acute situation
- 177 This classification was conducted by two researchers (BH, JF)  
178 who independently classified a sub-sample of 40 goals. These  
179 were then compared and discussed to ensure a common  
180 interpretation. The remaining goals were then analysed  
181 independently, and any uncertainties or discrepancies  
182 resolved by discussion.
- 183 • The use of any assistive devices, orthoses, standing frames  
184 etc. described within a goal was identified by applying the ICF  
185 code 'e115 – Products and technology for personal use in  
186 daily living'.
  - 187 • Some goals required the support or assistance of another  
188 person, either for direct physical assistance, facilitation,  
189 supervision or for giving prompts. In these cases we added  
190 the ICF codes 'e340 – Personal care providers and personal  
191 assistants' or 'e355 – Health Professionals' where this support  
192 was specifically provided by a health professional.
  - 193 • Where the content of a goal was more specific or precise than  
194 any of the available categories from a Core Set we initially  
195 allocated the category which most closely matched the overall

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196 sentiment of the goal and then recorded that the precise  
197 nature of the goal could not be classified.

198 • Where the content of a goal could not be matched against any  
199 of the available ICF codes from the Core Sets it was allocated  
200 'ND – Not Definable'.

201

202 Data analyses utilised descriptive statistics, providing frequency data  
203 of the goals against ICF domains of the components body functions,  
204 activities and participation and environmental factors from the SCI  
205 Core Sets. The frequency of goals which could not be classified  
206 according to the existing codes was also determined.

207

### 208 **Results**

209

210 The sample comprised 119 patients with a SCI diagnosis; 46 (38.7%)  
211 of whom were female. For the vast majority (114 or 95.8%) the  
212 underlying cause of their spinal cord injury was of a non-traumatic  
213 nature, and included spinal tumours, cord compression and  
214 inflammation. In 45 patients (37.8%) the lesion was in the cervical  
215 area and in 62 (52.1%) it was in the thoracic/lumbar area. For 12  
216 (10.1%) patients the database information was not clear enough to  
217 ascertain the precise level of lesion. 102 (86.7%) patients had an  
218 incomplete lesion and 8 (6.7%) had a complete lesion. For 9 patients  
219 the database information was not clear on their level of completeness.  
220 The mean (SD, median, range) age on admission was 53.3 (16.4,

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221 54.5, 67) and their mean (SD, median, range) length of stay was 43.6  
222 (38.4, 36.0, 368) days. The median (interquartile Range) FIM score  
223 on admission was 93.0 (34) and on discharge it was 113.0 (21). The  
224 median Barthel Index score on admission was 12.0 (9) and on  
225 discharge it was 18.0 (7).

226

227 These 119 patients generated 1509 goals with a mean (SD) of 10.5  
228 (9.1) goals per patient during the course of their inpatient  
229 rehabilitation stay. 95 of these goals had a secondary aspect and 5  
230 also had a tertiary aspect. By the end of their stay 1279 (77.7%) of  
231 these goals had been achieved, 154 (9.4%) had not been achieved,  
232 45 (2.7%) were still ongoing, 13 (0.8%) had been revised and 18  
233 (1.1%) were abandoned as they were inappropriate.

234 The majority of goals were multifaceted and were expressed through  
235 more than one ICF code; e.g. the goal *'to be transferring with minimal*  
236 *assistance from a nurse using a sliding board'* would have been  
237 expressed by three ICF codes (d420 for the transferring activity,  
238 e355 for the assistance provided by a health professional and e115  
239 for the use of a product of personal use). Classifying the 1509  
240 rehabilitation goals against the Comprehensive ICF Core set  
241 therefore generated 2909 ICF codes. Only 69 goals (4.6%) were  
242 classified as 'Not definable (ND)'. In all but 65 goals (95.7%) the ICF  
243 SCI Core Sets were not specific enough to fully express the goals set  
244 in rehabilitation; e.g. the goal *'To transfer from sitting to standing,*  
245 *using my arms to push up and taking weight through my feet before*

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246 *taking hold of Carter Rollator*' (walking appliance) was classified as  
247 d420 (transferring oneself) and e120 (products and technology for  
248 personal indoor and outdoor mobility and transportation). However,  
249 the detailed description goes much beyond this simple code and  
250 expresses the notion of quality of achieving this transfer and the  
251 exact nature/type/brand of equipment to be used.

252 Classifying the goals against the Brief ICF Core set generated 2076  
253 ICF codes. However, 751(49.8%) of these goals were classified as  
254 'ND'.

255 Table 1 provides a frequency breakdown of codes from the SCI core  
256 sets used against the 1509 rehabilitation goals from our sample.

257

258 *Table 1 about here*

259

260 When viewed against the major ICF categories then our results  
261 showed that the rehabilitation goals set by the patients in our sample  
262 were mostly related to mobility (62.6%) or self-care (35.2%). In 510  
263 (33.8%) goals products and technology were used and health  
264 professionals or other personal assistants played a significant role in  
265 achieving in 603 (40.0%) goals . Table 2 summarises the frequency  
266 (and percentage) of codes from the comprehensive ICF SCI Core  
267 Set against the major ICF domains.

268

269 *Table 2 about here*

270

271 **Discussion**

272 This study aimed to determine if it was possible to classify  
273 rehabilitation goals against the ICF Core Sets for SCI. It enabled us  
274 to ascertain how many of these goals could be classified onto the  
275 ICF SCI Core Data Sets and therefore give an indication of how  
276 these Core Sets may reflect inpatient rehabilitation practice. Our  
277 findings suggest that for the vast the majority of goals an appropriate  
278 code from the comprehensive Core Set could be identified. This  
279 supports the findings by Herrmann et al.<sup>8 9</sup> who investigated the  
280 applicability of the ICF Core Sets for SCI to physiotherapy and  
281 occupational therapy practice and also Mittrach et al.<sup>22</sup> who  
282 concluded that goals of physiotherapy can be described with the  
283 language of the ICF.

284

285 Classification of goals against the Brief Core Set proved much more  
286 difficult because there was no equivalent code for almost half of the  
287 goals. The usefulness of the Brief Core Set therefore seems limited  
288 within the context of rehabilitation goal setting. Others have also  
289 suggested that the Brief Core Sets for SCI reflect relevant areas of  
290 activity and participation in only a limited way and may require  
291 revision<sup>23</sup>; alternatively categories from the comprehensive set could  
292 substitute insufficient Brief Core Set categories<sup>6</sup>. Even though we  
293 were able to identify appropriate codes for the majority of goals we  
294 found that in most cases the goal description was more extensive or  
295 more specific than the ICF codes permitted. In many cases an ICF

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296 code ending in '8' or '9' ('other specified' or 'unspecified') could have  
297 been used. However, the use of these codes ending in 8/9 has been  
298 specifically discouraged in the ICF linking rules<sup>21</sup>. Additional  
299 elements, beyond the broad goal topic (such as transferring, walking  
300 or dressing), were embedded in the goal. These elements would  
301 contribute to making the goals SMART<sup>14</sup>, by adding specificity on the  
302 activity, any support or equipment needed, the timeframe and  
303 quantification of the performance. In line with the aims of clinical  
304 practice, goals also focused on enhancing the 'quality' of movement,  
305 making reference to good posture, expected movement sequence or  
306 appropriate weight bearing. This supports the notion that  
307 rehabilitation goals are often educational in nature, making explicit to  
308 the patient 'how to' achieve particular tasks. Barnard et al.<sup>13</sup>  
309 described the process of goal setting as being heavily influenced by  
310 members of the rehabilitation team, particularly when describing the  
311 quality standards of a goal. This quality element seems less  
312 important to the developers of the ICF; it is possible that it represents  
313 a unique priority for therapists involved in rehabilitation, although this  
314 has yet to be investigated.

315 The focus of the vast majority of goals was related to activity and  
316 participation issues of mobility (62.6%), self-care (35.2%) and  
317 domestic life (13.9%). These were similar priorities as found by  
318 some<sup>24,25</sup> but not to others<sup>26,27</sup>. In particular, goals relating to  
319 employment, leisure activity and personal relationships were  
320 infrequent in our sample. Patients at a later stage of their

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321 rehabilitation journey, or following return to the community may well  
322 have a greater interest in these areas.

323 Very few goals (0.5%) focused on the impairment level, which aims  
324 at improving individual body structures or individual body functions.

325 Wallace et al.<sup>17</sup> also found that activity and participation goals were  
326 a key focus for individuals with SCI at the transition from hospital to  
327 home.

328 Most of the patients in our sample had an incomplete SCI of non-  
329 traumatic origin. Therefore our findings may not generalise to  
330 individuals with complete lesions of traumatic origin. They may  
331 therefore also not generalise to patients who undergo rehabilitation in  
332 a specialist SCI centre<sup>28</sup>. Our investigation was based on a  
333 retrospective analysis of rehabilitation goals against the language of  
334 the ICF. The goals in our sample were not necessarily written with a  
335 full knowledge of the ICF or desire to use the language of the ICF by  
336 either the patients or the multi-disciplinary team members. Therefore,  
337 goals set with the specific intent to utilise the language of the ICF  
338 may have produced a much better match. There seems merit in a  
339 more standardised use of the ICF language when setting goals as  
340 this may facilitate better comparisons of outcomes. However, using a  
341 standardised language should not limit the content of goal setting,  
342 particularly relating to the specificity of such goals.

343

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348 **Conflict of interest**

349 The authors declare no conflict of interest.

350

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