Rehabilitation Research Review™

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Issue 39 – 2016

In this issue:

Abbreviations used in this issue
ABI = acquired brain injury
ACL = anterior cruciate ligament
TBI = traumatic brain injury
TJR = total joint replacement
TKA = total knee arthroplasty

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Rehabilitation Counsellors are tertiary qualified allied health professionals who work with individuals with disability, injury or social disadvantage, along with their families, organisations and other health professionals, to deliver work, life and career solutions. The core skills and expertise of Rehabilitation Counsellors include: vocational assessment, job placement support, and career development; rehabilitation and return-to-work services; workplace disability prevention and management.

Welcome to issue 39 of Rehabilitation Research Review.

The evidence in a couple of papers in this issue underlines the fact that effective rehabilitation of patients after an anterior cruciate ligament (ACL) reconstruction needs to focus on more than restoring muscle power and functional stability to levels that are similar to the uninjured leg. We need to recognise the important role played by psychological factors in rehabilitation to preinjury sporting activity.

Another paper discusses how decision-making experiences play an important role in the ongoing process of self-conceptualisation after a traumatic brain injury. The paper emphasises that an individual's social support network acts as a bridge between participation and self-conceptualisation. Supporters can maximise participation in decision-making and thereby help a person with TBI to develop positive self-attributes and contribute to shaping their future goals.

I hope that you find the research in this issue useful in your practice and I welcome your comments and feedback.

Kind regards,

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Improving patients' experience and outcome of total joint replacement: the RESTORE programme

Authors: Blom AW et al.

Summary: This article details outcomes from the REsearch STudies into the ORthopaedic Experience (RESTORE) programme, which used various research methods including literature reviews, interviews with patients and health-care professionals, studies observing patient recovery over time, and randomised trials to assess new methods that may improve long-term recovery after hip and knee replacement. The assessment revealed that poor long-term recovery is more likely in patients with worse psychological health, disability or pain before surgery. Patients describe the importance of support by health and social professionals throughout the joint replacement pathway. The evidence suggests that patients may benefit from education, pain management, counselling, exercise and management of health conditions before surgery, and from supply of aids and home modifications and physiotherapy after surgery. Local anaesthetic injections during surgery reduced long-term pain and was cost-effective in patients with hip replacement.

Comment (DR): This is a freely accessible report on a series of studies conducted in the United Kingdom that aimed to better understand how to improve patients' experience and outcomes associated with total hip and knee replacement. Although very comprehensive (550 pages!), it is well worth a read if you work with these populations. Despite a notable increase in the number of joint replacements performed around the world, the findings from these studies clearly articulate that there is a subgroup of people who do not have good outcomes from surgery, both in terms of pain and function. Poor outcomes may occur in as many as 1 in 3 people, particularly after total knee replacement. Those people with poorer mental health (e.g. depression, anxiety), higher pain levels and worse function preoperatively have consistently been shown to be at greater risk of poor outcomes. This brings into question conventional wisdom around the timing of joint replacement – perhaps we are leaving it too late in some people, operating at a time when pain and function have deteriorated too far? Alternatively, preoperative interventions designed to improve function and optimise the management of pain and mental health conditions may be needed in people who are identified as high risk for a poor outcome after joint replacement surgery.

Reference: Programme Grants Appl Res. 2016;4(12):
Abstract

Independent commentary by Dr William Levack and Dr David Rice

Dr William Levack is the Associate Dean of Research for the Wellington campus of the University of Otago, and a Senior Lecturer with the Rehabilitation Teaching and Research Unit – a specialist provider of distance-taught postgraduate qualifications in rehabilitation for health professionals run by the Department of Medicine, University of Otago Wellington. **FOR FULL BIO CLICK HERE**

Dr David Rice is a Senior Lecturer in the School of Clinical Sciences and a Senior Research Officer in the Health and Rehabilitation Research Institute at AUT University. He also has a position as a Scientific Officer in the Department of Anaesthesiology and Perioperative Medicine at Waitemata DHB. David has a PhD in neurophysiology. His research focuses on the neuromuscular consequences and management of joint injury and arthritis, predictors of post-surgical pain, the mechanisms and management of chronic pain conditions and the effects of pain on motor performance.

Efficacy of preoperative progressive resistance training on postoperative outcomes in patients undergoing total knee arthroplasty

Authors: Skoffer B et al.

Summary: This study randomised 59 patients undergoing total knee arthroplasty (TKA) to undergo either 4 weeks of preoperative and 4 weeks of postoperative progressive resistance training (PRT), or 4 weeks of postoperative PRT only (control group). All patients participated in performance-based measures (30-second chair stand test [30sCST], timed-up-and-go [TUG], and walking tests), knee extensor and flexor muscle strength (dynamometry), patient-reported functional performance, as well as health-related quality of life and pain score evaluations, at 6 weeks and 1 week before TKA, and at 1, 6, and 12 weeks post-TKA. When comparing the changes from baseline to the primary test point 6 weeks after TKA, the following measures were significantly in favour of the intervention group: the 30sCST (2.5 repetitions vs –1.1 repetitions; p<0.004), the TUG (–0.7 seconds vs 0.8 seconds; p=0.015), normalised knee extensor muscle strength (–0.2 Nm/kg vs –0.4 Nm/kg; p=0.002) and normalised knee flexor muscle strength (0.1 Nm/kg vs 0.0 Nm/kg; p=0.016). Patient-reported outcomes did not differ between the groups.

Comment (DR): Several studies have previously explored whether prehabilitation leads to better outcomes after orthopaedic surgery. A recent systematic review and meta-analysis (http://www.ncbi.nlm.nih.gov/pubmed/23093216) of 7 studies in people having total knee joint replacement concluded that no postoperative outcome consistently improved with prehabilitation, apart from a small effect on length of stay. However, the prehabilitation offered has typically been conservative, often using low training intensities. The current study is unique, in that it is one of the first to use a progressive, high-intensity (8–12 repetition maximum) resistance training programme. Importantly, there were no adverse events and adherence was very high (>90%). The authors observed a number of improvements in measures of muscle strength and functional performance preoperatively and in the first 12 weeks after surgery in favour of the intervention group. This was despite only training one leg (when bilateral strength deficits are common) for a short duration (4 weeks). It would be interesting to see if further gains are possible with bilateral training and for a longer period of time. Given the less than optimal postoperative outcomes already highlighted in this population, prehabilitation could yet prove its worth.

Reference: Arthritis Care Res (Hoboken). 2016;68(9):1239-51
Abstract

Effects of multi-site infiltration analgesia on pain management and early rehabilitation compared with femoral nerve or adductor canal block for patients undergoing total knee arthroplasty

Authors: Li D et al.

Summary: This study randomly assigned 77 patients undergoing TKA to 1 of 3 procedures: multi-site infiltration analgesia (MIA group; n=26); femoral nerve block (FNB group; n=27); or adductor canal block (ACB group; n=24). Pain management and early rehabilitation effects were compared between the procedures. Compared with FNB and ACB, MIA was associated with superior pain control at rest during the first 12 hours and less opioid consumption postoperatively (p<0.05 for all comparisons), whereas outcomes were similar between FNB and ACB. In early rehabilitation evaluations, MIA and ACB had similar outcomes on postoperative muscle strength, but both resulted in greater quadriceps strength compared with FNB (p<0.05). In the early postoperative period, the FNB group had significantly better knee range of motion but less ambulation ability than either the MIA or ACB groups (p<0.05 for all comparisons); MIA was superior to ACB for these measures (p<0.05). Compared with FNB and ACB, MIA was associated with shorter operating times and postoperative hospital stays (p<0.05); these parameters did not differ significantly between the ACB and FNB groups.

Comment (DR): This small randomised controlled trial (n <30 in each group) compared the effects of three different regional anaesthetic techniques on various outcome measures in the early postoperative period after total knee joint replacement. While not without its methodological shortcomings, this study found that multisite local anaesthetic injection in and around the operated knee was statistically superior on several outcomes including measures of resting pain and early mobilisation compared to single shot nerve femoral nerve or adductor canal block. This is perhaps not that surprising, as nerve blocks often have a detrimental effect on motor function and the knee is innervated by a number of different nerves, making it difficult to adequately control postoperative pain with a single nerve block. However, most of the differences observed in this study appeared small and of questionable clinical importance and patient satisfaction was not different between groups. To me, a much more important research question is whether the anaesthetic/analgesic technique used in the perioperative period influences long-term outcomes of joint replacement such as persistent pain, something that has yet to be clearly determined, with conflicting findings to date.

Reference: Int Orthop. 2016 Aug 25. [Epub ahead of print]
Abstract

Return to knee-strenuous sport after anterior cruciate ligament reconstruction: a report from a rehabilitation outcome registry of patient characteristics

Authors: Hamrin SE et al.

Summary: This investigation included 157 patients aged 15–30 years who had undergone primary anterior cruciate ligament (ACL) reconstruction and were all involved in knee-strenuous sports. Data were examined from isotonic tests of muscle function and patient-reported outcome measures, the Tegner activity scale (Tegner et al. Clin Orthop Relat Res. 1985;198:43-9), physical activity scale, knee injury and osteoarthritis scale and knee self-efficacy scale. All participants had a pre-injury Tegner of ≥6. At 10 months postoperatively, the 52 patients who returned to pre-injury Tegner scores had better subjective knee function on the knee injury and osteoarthritis outcome score compared with patients who did not ($p<0.05$). These 52 patients also had higher perceived self-efficacy of knee function on the knee self-efficacy scale ($p<0.01$). The 84 patients who returned to knee-strenuous sports (i.e. Tegner ≥6) after ACL reconstruction had higher goals for physical activity ($p<0.01$) and higher self-efficacy of future knee function ($p<0.05$) compared with patients who did not return to knee-strenuous sports. Strength measurements showed that women who returned to sports were stronger in leg extension than women who did not.

Comment (DR): Return to preinjury sporting activity is usually an important goal for people undergoing ACL reconstruction and has been linked to higher satisfaction and quality of life. Unfortunately, the number of people who achieve this goal is surprisingly low. Similar to previous studies, this paper found that the majority of people (67%) did not return to sport at or near their pre-injury level 6–18 months after surgery, while only just over half returned to any type of knee-demanding activity. A focus in rehabilitation is often to restore muscle power and functional stability to levels that are similar to the uninjured leg. Interestingly, in this study the mean limb symmetry index for both muscle power and hop test performance was not different between those who had returned to knee-demanding sport and those who had not, with both groups achieving commonly recommended levels of ≥90% of the uninjured limb. This is one of a number of studies that have now shown that psychological variables such as self-efficacy and fear of re-injury may be important factors in determining whether a person is likely to return to sport. These factors deserve more attention if we are to more effectively rehabilitate people after ACL reconstruction and get them back to their valued sporting activities.

Reference: Knee Surg Sports Traumatol Arthrosc. 2016 Aug 16. [Epub ahead of print]
Abstract

Psychological factors are important to return to pre-injury sport activity after anterior cruciate ligament reconstruction: expect and motivate to satisfy

Authors: Sonesson S et al.

Summary: This study recruited 65 individuals aged 15–45 years who were scheduled for ACL reconstruction. All participants completed the International Knee Documentation Committee Subjective Knee Form (IKDC-SKF) and questions about expectations, satisfaction, and motivation preoperatively and at 16 and 52 weeks after surgery. Before surgery, the majority (86%) of participants stated that their goal was to return to their pre-injury sport activity. Those who had returned to their pre-injury sport activity 1 year after the ACL reconstruction were more motivated during rehabilitation to return to their pre-injury activity level, more satisfied with their activity level and knee function at 52 weeks, and scored significantly higher on the IKDC-SKF (median 92.0) at 52 weeks, compared to those who had not returned (median 77.6).

Comment (DR): This is a nice follow-up to the previous study and reiterates that most people (86% in this study) undergoing ACL reconstruction have a preoperative goal to return to their preinjury sporting activity and rate the importance of this goal very highly (median score of 10/10 where 1 = not important at all and 10 = very important). Rehabilitation after ACL reconstruction is often long and demanding and some people may not be fully prepared for this. Interestingly, it didn't appear as if people's preoperative expectations were unrealistic in this study, with 86% expecting their rehabilitation to take 7 months or longer; in line with recommended time frames. Those people that did achieve a return to their preinjury sporting activity within the first year after surgery had more confidence preoperatively that it was possible to return to their sport, perhaps reflecting greater optimism and/or self-efficacy. Those that did return were also better able to maintain their motivation during the rehabilitation period. An important question to answer in the future is what are the most effective strategies physiotherapists can use to improve patient motivation in pursuit of their goal to return to preinjury sporting activity?

Reference: Knee Surg Sports Traumatol Arthrosc. 2016 Aug 25. [Epub ahead of print]
Abstract

What are the barriers and facilitators to goal-setting during rehabilitation for stroke and other acquired brain injuries? A systematic review and meta-synthesis

Authors: Plant SE et al.

Summary: This systematic search of the literature identified 9 qualitative investigations examining the barriers and facilitators to goal-setting during stroke/neurological rehabilitation and other acquired brain injuries. The studies involved a total of 202 participants – 88 patients, 89 health care professionals and 25 relatives of participating patients. Four main themes emerged as barriers to goal-setting: Differences in staff and patients' perspectives of goal-setting; patient-related barriers; staff-related barriers, and organisational or service level barriers. Three themes emerged as facilitators to goal-setting: individually tailored goal-setting processes; strategies to promote communication and understanding; and strategies to avoid disappointment and unrealistic goals. In addition, patients' and staff's knowledge, experience, skill, and engagement with goal-setting could be either a barrier (if these aspects were absent) or a facilitator (if they were present).

Comment (WL): This review is part of a growing body of knowledge related to the application of goal-setting in neurorehabilitation. In the past, rehabilitation has drawn heavily on research from outside of the health sector such as from cognitive psychology (or perhaps just from popular ideas in the 'self-help' industry) in order to develop our models for goal-setting in clinical contexts. While this has provided rehabilitation with a starting point for thinking on goal-setting, it is increasingly clear there is a need for the development and testing of rehabilitation-specific theories of goal-setting. Such theories will need to take into account factors like the range of emotional and behavioural responses of people to newly-acquired disability, the relatively high level of uncertainty around likely outcomes of rehabilitation for individual people, and the additional challenges that impact on communication and empowerment when brain impairments are involved. This review consolidates a number of emerging perspectives in this regard and so provides another step on the path towards more sophisticated, tailored approaches to goal-setting in neurorehabilitation.

Reference: Clin Rehabil. 2016;30(9):921-30
Abstract

Technological aids for the rehabilitation of memory and executive functioning in children and adolescents with acquired brain injury

Authors: Linden M et al.

Summary: These researchers examined the effects of technology-based interventions (including pagers, smartphones, internet-based interventions, and voice recorders) in rehabilitating children and adolescents with acquired brain injury. A search of the literature revealed 4 eligible studies (all conducted in North America) involving 206 participants with traumatic brain injury (TBI; i.e. a brain injury resulting from a road traffic accident, fall, or blow to the head). Interventions included: an online Counsellor-Assisted Problem Solving (CAPS) intervention to rehabilitate executive functioning in 120 adolescents aged 12–17 years (1 study); a Teen Online Problem-Solving intervention targeting executive functioning of 35 adolescents aged 11–18 years (1 study); an online Family Problem-Solving intervention targeting outcomes such as behaviour and aspects of executive functioning in 40 children aged 5–16 years (1 study); and a computer programme targeting cognitive-communication skills including memory and aspects of executive functions in 12 adolescents and young adults aged 12–21 years (1 study). The review found relatively modest evidence demonstrating that interventions employing technological aids did improve executive functions in adolescents with TBI. The reviewers speculate that this improvement is unlikely to have a clinically important effect on the child. The one study that employed technology to improve memory in adolescents with TBI showed an improvement for the intervention group, but the effectiveness of this approach could not be verified, due to a lack of adequate statistical information. The 2 studies that examined the secondary outcomes of anxiety and depression did not show any effect between the intervention and control groups at 6 months' follow-up. Only one study recorded adverse events, and reported that none occurred. Two studies reported on the amount of use the intervention received. One study reported improvements in social functioning/social competence for the intervention group.

Comment (WL): The fast-growing world of digital technology offers huge potential for addressing many issues related to impairments of physical and cognitive function. This review focuses on the use of digital technology as a delivery mechanism for therapeutic interventions rather than as a tool to compensate for disability in real-world contexts, which is another area where people with cognitive impairments may benefit from digital technology. The main value of using digital technology as a therapeutic aid appears to be its capacity to increase 'on demand' access to rehabilitation interventions. However, only a small number of what are effectively preliminary studies were found in this review, making this report more of a foundation for future research and discussion than a guide for clinical practice as of yet.

Reference: Cochrane Database Syst Rev. 2016;7:CD011020
Abstract

Experiences of patients with traumatic brain injury and their carers during transition from in-patient rehabilitation to the community: a qualitative study

Authors: Abrahamson V et al.

Summary: This research explored narratives from semi-structured interviews conducted with 10 patients who had sustained a severe TBI and 9 carers at approximately one month post-discharge from in-patient rehabilitation into living in the community. Three key findings are discussed. Firstly, perceptions of support were mixed but many patients and carers felt unsupported in the inpatient phase, during transitions between units and when preparing for discharge. Secondly, they struggled to accept a new reality of changed abilities, loss of roles and loss of autonomy. Thirdly, early experiences post-discharge exacerbated fears for the future.

Comment (WL): While the results of this study are very much dependent on the context of care (in this case, the context was an in-patient neurorehabilitation unit in an English hospital), this study highlights the importance of excellent communication skills, compassion, and coordination of care when dealing with families of people with TBI. Returning home after TBI is always going to be a turbulent time for people with TBI. However, the distress of this period can be greatly ameliorated if the emotional effects on people with TBI and their family are appropriately recognised, acknowledged and addressed. This should be considered as important as physical recovery, and adequate time and energy should be allocated to helping those most severely affect by TBI adjust to life back in the community.

Reference: Disabil Rehabil. 2016:1-12. [Epub ahead of print]
Abstract

"I've never been a yes person": Decision-making participation and self-conceptualization after severe traumatic brain injury

Authors: Knox L et al.

Summary: This study used constructivist grounded theory methods to explore the transcripts of 20 -in-depth interviews conducted with adults who had sustained severe TBI. The interviews sought to determine how participation in decision-making contributes to self-conceptualisation in such people. The analysis revealed self-conceptualisation to be a complex and multifaceted process, as individuals with TBI aim to re-establish a sense of autonomy. The article describes a recursive relationship in which decision-making participation assists the dynamic construction of self, and self-concept contributes to the experience of making decisions. It goes on to detail how an individual's social support network helps to act as a bridge between participation and self-conceptualisation.

Comment (WL): This extremely thoughtful paper provides an in-depth examination on the relationship between self-concept and decision-making capacity/opportunity after TBI. Rehabilitation has seen, in the past, a shift away from a focus on impairment to a focus on restoration of functional abilities. Studies like this push the concept of rehabilitation further – rather than rehabilitation just being about restoration of physical independence, rehabilitation becomes the work of supporting people to reinvent themselves; to develop a new, valued sense of self. This paper postulates that a key part of this work involves a move toward maximising decisional autonomy (being in control of decisions about one's own life). Importantly, decisional autonomy does not necessarily require physical independence and, equally importantly, does not mean that people should just be left to their own devices. Decisional autonomy can be and should be supported through the efforts of health professionals, family and friends.

Reference: Disabil Rehabil. 2016:1-11. [Epub ahead of print]
Abstract

Prevalence of suicidal behaviour following traumatic brain injury: Longitudinal follow-up data from the NIDRR Traumatic Brain Injury Model Systems

Authors: Fisher LB et al.

Summary: This US study obtained data from the Traumatic Brain Injury Model Systems (TBIMS) National Database to examine the prevalence of depression and suicidal behaviour in a large cohort of patients who had sustained moderate-to-severe TBI. Participants presented to a TBIMS acute care hospital within 72 hours of injury and received acute care and comprehensive rehabilitation in a TBIMS designated brain injury inpatient rehabilitation programme. Depression and suicidal ideation were assessed by the Patient Health Questionnaire (PHQ-9). Over 20 years of follow-up, rates of depression ranged from 24.8–28.1%, suicidal ideation ranged from 7.0–10.1% and self-reported suicide attempts (past year) ranged from 0.8–1.7%. Participants who endorsed depression and/or suicidal behaviour at year 1 had consistently elevated rates of depression and suicidal behaviour 5 years after TBI.

Comment (WL): Clinical depression is a serious and common problem after TBI. This study provides further compelling evidence that people experience much higher rates of depression and suicidal behaviour after brain injury than does the general population. It is therefore essential that depression is taken seriously and closely monitored following TBI. Of note, the causes of problems with depression vary from person to person, possibly including factors such as emotional responses to changes in life roles and occupation, problems with self-identity, loss of friendships and social network as well as from impairments of emotional regulation and other organic changes to the brain injury. This means that treatment of depression after injury should be based on individual, holistic assessment. This study also highlights that early experiences of depression in the first year after injury are predictive of ongoing or recurrent episodes of mood disorder. Early identification and management of depression is likely to be key in reducing the health burden of this condition.

Reference: Brain Inj. 2016:1-8. [Epub ahead of print]
Abstract