**WHAT ARE THE PRIORITIES FOR STROKE REHABILITATION TECHNOLOGIES?**

A. Kerr¹, L. Baillie², M. Smith³, F. van Wijck⁴, A. Kuschmann¹, J. Fogarty⁵, A. Ritchie⁵, L. Reid⁶, N. Smith⁷, P. Rowe¹

¹University of Strathclyde, ²Heriot Watt University, ³NHS Lothian, ⁴Glasgow Caledonian University, ⁵Technology Users Group, ⁶Chest Heart and Stroke Scotland

**Category: Knowledge exchange**

**Background:** Rehabilitation technologies ranging from smartphone apps to advanced robotics can support efficient and effective delivery of rehabilitation; the integration of these technologies into mainstream practice, however, has been slow and variable. Resolving this disconnect between technology development and user adoption has the potential to benefit all stakeholders.

Our aim in this project funded by the Scottish Universities Insight Institute was to generate new thinking in this area through a consensus process to identify the priorities for rehabilitation technology.

**Method:** Consensus process, consisting of a survey of 177 end-users (stroke survivors, carers and healthcare professionals) from across Scotland and a follow up workshop of 50 stakeholders (end-users, third sector, technology developers, academics and policy makers) during which the 24 priorities, identified from the survey, were reduced incrementally through ranking, discussion and voting, to a top ten. Although initially ranked, stakeholders requested the final list should not be ordered as level of priority would differ according to context. The final list, therefore, was viewed as a circle (see figure).
Results:
Figure: Top ten priorities for stroke rehabilitation technology

Discussion: The process of identifying user priorities is an important first step toward improving adoption of stroke rehabilitation technologies. Through these discussions developers will gain a better understanding of the needs of users so that technology can fully achieve its potential of supporting stroke recovery for everyone.
More work to refine detail around how each priority relates to specific pieces of technology/equipment is planned, which will inform the future development of a technology users’ framework to guide technology customers (individuals and organisations) and developers.

Conclusion: A top ten list of priorities regarding stroke rehabilitation technologies was generated through a national survey of users and a consensus meeting of stakeholders. This provides an important step in improving adoption of technologies across the stroke rehabilitation community.
The use of commercial gaming devices in upper limb rehabilitation: the experience of stroke survivors

Thomson, K.¹, Pollock, A.¹, Brady, M.¹, Bugge, C.²
¹Nursing, Midwifery and Allied Health Professions Research Unit, Glasgow Caledonian University, UK. ²School of Nursing, Midwifery and Health, University of Stirling, UK.

Category: Research

Background
Approximately 30% of stroke survivors experience an upper limb impairment, which greatly impacts on participation and quality of life. Commercial gaming devices (e.g. Nintendo Wii) are being incorporated into rehabilitation to improve function. We explored the stroke survivor experience of using commercial gaming devices as an upper limb intervention.

Method
Semi-structured, individual interviews with 13 stroke survivors living within the United Kingdom were completed. Interviews were audio-recorded, transcribed verbatim and analysed using framework methods. Transcripts were coded and summarised into thematic charts. Interpretation of data occurred with the aid of a central chart to assist in the identification of relationships between themes. Thematic charts were refined during analysis and through research team discussion until the final framework emerged.

Results
Experiences were captured from 12 stroke survivors who used Nintendo Wii gaming device and opinions from one stroke survivor who was not offered this intervention. Findings identified that use of gaming devices for upper limb rehabilitation is acceptable for all age groups but that varying levels of enthusiasm exist. Enthusiastic players described gaming as having a positive impact on their motivation to engage in rehabilitation. For some this became a leisure activity, which encouraged self-practice. Non-enthusiastic players preferred real sports compared to gaming.
Discussion
Suitability of gaming should be assessed on an individual basis and take stroke survivor abilities and preference for interventions into consideration. Stroke survivors should not be automatically excluded from gaming based on their age or previous use of technology. Use of gaming devices has the potential to increase the intensity (dose) of upper limb movements.

Conclusion
An in-depth account of the stroke survivor experience of using gaming devices within upper limb rehabilitation has been captured. Use of gaming devices offers potential for the provision of cost and resource efficient upper limb practice.
Physical Activity for Non-ambulatory Stroke Survivors (PHANSS-1): Exploring the thoughts and views of Health and Exercise Professionals

Megan Lloyd (Glasgow Caledonian University) Dawn Skelton (Glasgow Caledonian University), Brian Williams (University of Stirling), Gillian Mead (University of Edinburgh), Frederike van Wijck (Glasgow Caledonian University)

Category: Research

Background
Stroke guidelines recommend physical activity (PA); however recommended interventions use walking, excluding non-ambulatory stroke survivors (SS) (i.e. those who cannot walk independently). This is an important gap, because sedentary behaviour, known to be an independent risk factor for ill-health, places non-ambulatory SS at higher risk. To design a new PA intervention for this population, it is important to seek service user and provider views to ensure its acceptability.

Aim: to explore the views of service providers; exercise professionals (EP) and health professionals (HP), on needs, goals, barriers, motivators and preferred format of PA.

Methods
Design: Qualitative
Study population: EPs recruited through Later Life Training, HPs recruited through the Scottish Stroke Allied Health Professionals Forum.
Data collection: Individual telephone interviews (around 75 minutes) with EPs (N=4) and HPs (N=4).
Data analysis: Transcripts were analysed using framework analysis with embedded constant comparative method.

Results
Key themes: Gate keepers to PA, barriers and facilitators to PA delivery and participation, and pragmatic PA programme delivery and content. An overarching theme of a general lack of service provision for this population was reported by both groups of professionals. PA interventions should be based around and adapted to the individual needs of SS. Transport provision was seen as a key motivator to participation. Group, chair based PA programmes were suggested to be the optimal delivery method.
Discussion
Service providers expressed the need for a novel PA programme for non-ambulatory SS, while noting the practical barriers to implementing such a service within the current health system. The results will help inform the design of a novel PA intervention for non-ambulatory SS (PHANSS-2).

Conclusion
The emerging themes suggest that a chair based group programme would be the most acceptable form of PA delivery to non-ambulatory SS. However, future studies are needed to explore the feasibility and acceptability of this form of PA programme for this population.
The long-term effects of wearing an Ankle Foot Orthosis: the experiences of stroke survivors

Taylor A (1), Alexander G (2), Munro N (2), Kerr K

Faculty of Health and Sport Sciences, University of Stirling (1), NHS Greater Glasgow and Clyde (NHSGGC) (2)

Category: Research

Background to project
A small clinical audit carried out by one of the co-applicants found that only one patient attending her clinic could put their Ankle Foot Orthosis (AFO) on independently. All patients reported long term problems with standing, transferring or mobilising in bare feet with a history of falling. A scoping review of the literature identified numerous studies focussing on gait, balance and muscle tone with a lack of studies exploring the long-term effects of an AFO. This study therefore aimed to explore the experiences of wearing and using an AFO with stroke survivors.

Method
This was a mixed methods study. A questionnaire was used to gather a range of views from stroke survivors on wearing and using an AFO, with telephone interviews used to explore participants’ experiences in more depth. The Local Enhanced Service database searched for stroke survivors discharged from hospitals across NHSGGC in the last 1 to 5 years. The sample identified was then cross referenced against the Orthotic Database to identify all stroke survivors prescribed an AFO in the same time frame. Stroke survivors (n=493) were lettered about the study and invited to participate. From the letter response 45 participants were contacted and sent the questionnaire with a response rate of 22. As there are limitations with using questionnaires, a sub sample of seventeen stroke survivors agreed to participate in a telephone interview to explore the questionnaire responses in more detail and in the context of their own experiences.

Results
Over half of the sample reported wearing an AFO every day (54%) with the majority reporting that their walking was steadier (84%). However, when exploring falls, 42% reported a fall when wearing an AFO with 46% reporting a fall when not wearing an AFO. 46% had never been shown how to walk without an AFO.
Poster presentations

1. **Robot Assisted Training for the Upper Limb after Stroke (RATULS) WIP**

Bosomworth H\(^1\), Aird L\(^2\), Andole S\(^3\), Dawson J\(^4\), Eyre J\(^1\), Finch T\(^1\), Ford G\(^5\), Hogg S*, Howel D\(^1\), Hughes N\(^6\), Krebs H\(^7\), Price C\(^1,2\), Rochester L\(^1\), Shaw L\(^1\), Ternent L\(^1\), Turner D\(^8\), Vale L\(^1\), van Wijck P\(^9\), Warburton E\(^10\), Wilkes S\(^11\) and Rodgers H\(^1,2\).

\(^1\)Newcastle University; \(^2\)Northumbria Healthcare NHS Foundation Trust; \(^3\)Barking, Havering and Redbridge University Hospitals NHS Trust; \(^4\)University of Glasgow; \(^5\)Oxford Academic Health Science Network \(^6\)NHS Greater Glasgow and Clyde; \(^7\)Massachusetts Institute of Technology; \(^8\)University of East London; \(^9\)Glasgow Caledonian University; \(^10\)Cambridge University Health Partners; \(^11\)University of Sunderland; *lay representative.

**Category:** Research

**Background:**

Loss of the ability to use the arm is a common and distressing consequence of stroke. Currently it is unclear how best to provide therapy to improve arm recovery and function. Research suggests that robot-assisted training may be beneficial but this is not yet proven and further research is needed.

**Method:**

*Study design:* A pragmatic multicentre randomised controlled trial, cost analysis and process evaluation.

*Study setting:* Four study centres in the UK each consisting of a hub hospital with an InMotion robotic gym system and up to three adjacent hospitals (spoke sites).

*Study participants:* Adults with acute or chronic stroke (1 week to 5 years post stroke) causing moderate to severe upper limb functional limitation.

*Study treatments:* There are three randomisation groups:

i. Robot assisted training using the InMotion robotic gym system delivered for 45 minutes, three times per week for 12 weeks.

ii. Enhanced upper limb therapy delivered for 45 minutes, three times per week for 12 weeks.

iii. Usual NHS care.

*Randomisation:* Central independent web based service.
Primary outcome: Upper limb function measured by the Action Research Arm Test at 3 months.
Secondary outcomes: Upper limb impairment, activities of daily living, quality of life, resource use and adverse events measured at 3 and 6 months.
Blinding: Outcomes assessments by blinded assessor.
Parallel process evaluation: Semi-structured interviews with a sub-sample of participants and staff.
Sample size: 720 participants.

Current study status:
Recruitment commenced in April 2014. Current recruitment (21.03.2016) is 354 participants.
2. Upper limb function after stroke: what outcomes matter most?  
(Work in Progress)

Julie Duncan Millar, Dr Alex Pollock, Prof. Frederike van Wijck, Dr Myzoon Ali.

JDM, AP, MA: NMAHP Research Unit, Glasgow Caledonian University.  
FvW: School of Health and Life Sciences, GCU.

Category: Research

Background:
Effective stroke upper limb (UL) rehabilitation is a recognised research priority.  
Randomised controlled trials (RCTs) measure many different outcomes to determine efficacy 
of stroke UL rehabilitation, however it is not clear what outcomes are most important to those 
involved in rehabilitation.  Therefore, this study aims to identify what is most important to 
stroke survivors, their carers, and health professionals across Scotland, in relation to arm 
function after stroke.

Method:
We will conduct focus groups (n=16) using Nominal Group Technique (NGT) to identify and 
rank important outcomes at eight NHS Scotland sites. NGT, a consensus development 
method, allows participants to reflect on, record and express their views in a structured and 
equitable way.
We will purposefully sample participants and sites to represent a broad range of 
backgrounds and demographics. Main inclusion criteria: stroke survivors, and carers of 
estroke survivors, whose stroke has affected their UL; and health professionals with 
experience in treating stroke survivors with UL impairment. We will conduct separate NGT 
with stroke survivors and carers, and health professionals.  We will ask participants to express opinions about "What matters most about the arm and how it affects life after stroke?" from their perspective.  Data will be analysed using thematic 
analysis.

Results:
The initial results will be presented.
Discussion:
The results of this study will be used to inform planned consensus activities to standardise outcome measures used in future stroke UL rehabilitation RCTs.

Conclusion:
By identifying outcomes of importance to service users and providers, we will inform data collection in future stroke UL rehabilitation research including using standardised outcome measures in RCTs. This will provide trial results shared in a common language enabling researchers to easily compare and pool study results to identify effective treatments. In turn, this will improve guidelines on stroke UL rehabilitation and patient care.
3. A retrospective 12 month audit looking at provision and results of using ‘off-the-shelf’ Lycra for the upper limb following stroke in patients attending the stroke spasticity clinic in NHS Greater Glasgow and Clyde

Gillian Alexander. NHS Greater Glasgow and Clyde

**Category:** Audit or service evaluation

**Background:** Over the past 2 years we have been using ‘off-the-shelf’ Lycra sleeves and gloves in the stroke spasticity clinic in NHS Greater Glasgow and Clyde. There is good evidence for the use of Lycra in children with cerebral palsy and new research is beginning to show the positive effects of using Lycra in adults. Dynamic compression has been demonstrated to improve control and fluency of movement.

**Method:** The correct size of sleeve is applied to the hemiplegic arm with the seam extending from the medial border of the wrist to the lateral border of the elbow finishing at the insertion of deltoid, giving a sustained stretch on the pronators. When a positive difference has been noticed the patient is encouraged to buy one themselves. A retrospective audit of patients attending the stroke spasticity clinic between 01/04/2015 to 31/03/2016 was carried out.

**Results:** 31 stroke patients were tried with an ‘off-the-shelf’ Lycra sleeve and/or glove. The average age was 55, ranging from 39 to 76 years. 19 patients were male. All patients had been diagnosed with stroke; the majority had suffered an infarct (18/31). 16 had left, 14 had right and 1 had bilateral hemispheric stroke. All had spasticity in the affected upper limb. Time since stroke ranged from under 5 months to 20 years. In 87% of cases there appears to be a positive clinical response both subjectively and objectively. Patients have less associated reactions of the arm, hold their arm in a less flexed, pronated posture meaning they are at less risk of secondary structural shortening/contracture, arm comfort and hygiene is improved, there is less clonus and spasticity of the upper limb and in some cases there appears to be improved function of the limb and improved gait.

**Discussion and Conclusion:** Therapists should consider adding Lycra garments to their therapeutic stroke ‘tool-box’. There is a need for greater research into the effectiveness of Lycra garments in the stroke population.
4. Development of a patient and carer information leaflet for upper limb care following stroke

Jenni Wales, Stroke Specialist Physiotherapist, in conjunction with Rosslyn Scott and Stroke Physiotherapy team, Stroke Services NHSGGC

Category: Clinical practice innovation/Education innovation

Background: Due to the prevalence of altered arm function following stroke, a clinical effectiveness project was undertaken to explore management of the upper limb post stroke. Common themes of self management, positioning and carer involvement were highlighted in questionnaires sent to physiotherapy staff across NHSGGC to investigate interventions in upper limb management post stroke. It was therefore felt that a written resource could be developed which would supplement the verbal information and demonstrations of handling and positioning that were currently used by stroke physiotherapists.

Method: A booklet resource was developed by reviewing relevant guidelines, research articles and evaluating resources already available. Content was approved by physiotherapists across NHSGGC and NHSGGC AHP patient information review group. Medical illustrations produced photographs of Stroke patients to demonstrate appropriate positioning and handling of the upper limb.

Results: A booklet has been produced using a mixture of text, diagram and photographs using stroke patients to aid other forms of information such as joint sessions and demonstration of handling with carers.

Discussion: The booklet is to be evaluated to ensure that it is meeting the needs of patients, carers and physiotherapy staff

Conclusion: It is hoped that the booklet will supplement current education provided to patients and carers in order to improve self management of the upper limb post stroke.

References:
5. **An After Stroke Exercise Reminder Application**

N Micallef, L Baillie, S Uzor, Heriot Watt University
B Bain, F van Wijck, Glasgow Caledonian University

**Category:** Research

**Background**
Arm rehabilitation after stroke is a research priority\(^1\). A Cochrane overview suggests that an augmented dose of at least 20 hours task practice may improve arm function\(^2\), however the UK health service is unable to provide this face-face. Stroke survivors need to undertake self-practice but adherence is generally low. To encourage stroke survivors to undertake self-practice in an arm rehabilitation trial, we designed an exercise reminder application.

**Method**
- Design: feasibility study including individual interviews.
- Sample: N=15 (F=8, M=7) stroke survivors from local support groups: mean age 57 years (range 36-74 years), mean time post-stroke 6.5 years (range 1 month-19 years). Eleven participants reported their stroke as severe.
- Methods: participants configured and responded to their preferred reminder. System Usability Scale (SUS) was used to measure usability, NASA Task Load Index (NASA/TLX) to measure workload. Participants were asked whether they would use this application if it was available.

**Results**
Participants found the application to be usable: mean (SD) SUS Score 76/100 (±12) and low on workload: mean (SD) NASA/TLX score 12/100 (±7). All 15 participants reported they would use the application if available.

**Discussion**
Most participants found the application to be usable and low on workload, despite having experienced a severe stroke. Participants reported they would use this application because they found it easy to use and could configure it for their specific needs.
Conclusion

These results suggest that this arm exercise after stroke reminder application was considered user-friendly and feasible. It will now be implemented in the EVERLAP feasibility study on augmented arm rehabilitation.

References:


6. **EVERLAP: Early VERsus Later Augmented Physiotherapy compared with usual upper limb physiotherapy, protocol for an exploratory RCT of arm function after stroke (WIP).**

**Authors**
van Wijck F¹, Alexander G², Baillie L³, Bain B¹, Barber M⁴, Collins M¹, Dall P¹, Donaldson C¹, Fleming⁵, Granat M⁶, Kerr A⁷, Langhorne P⁸, McConnachie A⁸, Micallef N³, Molloy K⁶, Pollock A¹, Rowe P⁷, Uzor S³, Young HJ¹.

**Affiliations**
¹ Glasgow Caledonian University, Glasgow  
² NHS Greater Glasgow and Clyde, Glasgow  
³ Heriot Watt University, Edinburgh  
⁴ NHS Lanarkshire, Airdrie  
⁵ Different Strokes, Glasgow  
⁶ University of Salford, Salford  
⁷ University of Strathclyde, Glasgow  
⁸ University of Glasgow, Glasgow

**Category**: Research

**Background**
The majority of stroke patients experience reduced arm function, which often persists, affecting independence and quality of life. A recent Cochrane overview¹ indicates that augmenting exercise therapy time can be beneficial within stroke rehabilitation, suggesting that a total of at least 20 extra hours may improve arm outcomes. However, it is not clear whether it is more effective to start augmented arm therapy early (when neuroplasticity is more active) compared with later (when patients are more stable). The aim of this study is to test the feasibility of a definitive RCT by comparing three groups:

1. Usual arm physiotherapy (UAPT),
2. UAPT plus augmented arm physiotherapy starting within 3 weeks post-stroke,
3. UAPT plus augmented arm physiotherapy starting at 3 months post-stroke.
Methods

- Design: multi-centre, single-blinded, exploratory RCT.
- Setting: hospitals, rehabilitation units, community settings.
- Participants: adults with reduced arm function after stroke (N=75).
- Augmented arm physiotherapy:
  - content: evidence-based interventions aimed at improving functional activity of the affected arm. To encourage self-management, participants may choose a workbook, DVD and/or a novel mobile reminder service.
  - dose: 27 extra hours over 6 weeks.
- Feasibility assessment: recruitment, retention, adverse events, resource impacts, participant views.
- Outcome measures: Action Research Arm Test (primary) and a collection of standardised and self-reported impairment, activity and participation measures, assessed 4x (at baseline, before and after the intervention, 6 months follow-up).

Results

A favourable opinion has been received from the West of Scotland Research Ethics Committee (14/WS/1136).

Discussion

Recruitment is currently underway.

Reference

7. Increasing physical activity in stroke survivors using STARFISH, an interactive mobile phone application: a randomised controlled study. (WIP)

Aleksandra Dybus¹, Lorna Paul¹, Cindy Gray², Stephen Brewster³, Jason Gill⁴, Naveed Sattar⁴, Gill Alexander⁵
¹School of Medicine, University of Glasgow, ²Institute of Health and Wellbeing, University of Glasgow, ³School of Computing Science, University of Glasgow, ⁴Institute of Cardiovascular and Medical Sciences, University of Glasgow, ⁵NHS Greater Glasgow & Clyde

Category: Research

Background: There is good evidence of the effectiveness of regular physical activity (PA) in the primary and secondary prevention of several chronic diseases with walking being the most accessible form of PA in the stroke population. STARFISH, a smart-phone application, was designed by our group, as a behavioural change intervention to encourage the user to become more physically active. The accelerometer within the smart-phone records daily step count. STARFISH is undertaken in groups of four, each person is represented by a coloured fish within a fish tank and receive real time feedback on their own PA and that of each member of the group.

In our previous CHSS funded pilot study a six week intervention resulted in 39.3% increase in daily step count in the intervention group and 20.2% decrease in the control group however there was no follow up assessment (Paul et al. 2016). The aim of this randomised controlled trial is therefore to compare PA in stroke survivors who have undertaken a four month STARFISH intervention with a control group receiving usual care and to determine if the effects of the intervention are evident two months later.

Method: 128 people will be recruited across NHS Greater Glasgow & Clyde, NHS Ayrshire and Arran and NHS Lanarkshire and randomized to either intervention (n=64) or control group (n=64). The intervention group will use the STARFISH app for four months. Outcome measures: PA, sedentary time, heart rate, blood pressure, body mass index, The Nottingham Extended Activities of Daily Living Scale, Fatigue Severity Scale, Stroke Specific Quality of Life Scale, The Hospital Anxiety and Depression Scale, The Six-Minute Walk Test, 10-Metre Walking Test; will be taken at baseline, 4 months and 6 months.
Results: It is a 36 month study. Recruitment commenced in October 2015, to date, 29 participants have been recruited.

Reference:
8. **Physical Activity for Non-ambulatory Stroke Survivors (PHANSS-2): Developing a feasible and acceptable programme for stroke survivors who cannot walk independently (WIP)**

Megan Lloyd (Glasgow Caledonian University, GCU), Dawn Skelton (GCU), Brian Williams (GCU & University of Stirling), Gillian Mead (University of Edinburgh) & Frederike van Wijck (GCU)

**Category:** Research

**Background**
Stroke guidelines recommend physical activity (PA); however, there is a lack of evidence and service provision for non-ambulatory stroke survivors (i.e. those needing support of at least one person to mobilise). This is an important gap, because non-ambulatory stroke survivors are at higher risk of ill-health as they spend more time sitting. PA can improve health, mood and adaptation to life after stroke. Evidence involving stroke survivors who can walk cannot be applied directly to those who have difficulty walking, as many of the interventions use walking. Therefore a programme tailored specifically for those who have difficulty walking after stroke is required.

**Method**
Design: mixed-methods, observational feasibility study

**Objectives:**
1. To examine the recruitment and retention rates, preliminary effects and adverse effects, uptake and adherence to the intervention.
2. To explore the views of non-ambulatory stroke survivors and their carers on PA in general and the PA programme in particular.

Participants: Non-ambulatory stroke survivors living at home or in a care home (n=30).

**Intervention:**
Participants will receive either a home-based individual or group-based community PA intervention (according to preference). Both PA programmes will encourage life-style change and self-management.

The intervention will last for 12 weeks, with 1 supervised, 1 hour PA session and 2 self-managed home sessions per week. Participants will also take part in 4 short interviews/focus
groups and a final, optional, group session at the end of the intervention to reach a consensus on which elements worked well.

**Results**
Ethical approval has been obtained from the local HEI and recruitment is currently ongoing.

**Discussion**
The results of this study are intended to help inform a future RCT to determine the effectiveness of a PA programme for non-ambulatory stroke survivors.
9. THE NUMBER OF DAILY SIT TO STAND TRANSITIONS PERFORMED BY ACUTE STROKE PATIENTS UNDERGOING REHABILITATION

1Andy Kerr, 2J. Dawson, 1P. Rowe, 2T. Quinn
1University of Strathclyde, 2University of Glasgow

Category: Research

Background: The sit to stand (STS) transition is a frequently performed task; key to independent living and frequently affected by a stroke. Practising this movement during rehabilitation is therefore recommended (SIGN 118). The current practice intensity of STS during the rehabilitation period (during and outwith rehabilitation sessions) is, however, unknown. This observational study aimed to count STS repetitions during the rehabilitation period of stroke patients.

Methods: Participants were medically stable stroke patients referred for rehabilitation that included STS practice. An accelerometer, (Paltechnologies, Glasgow, Scotland) was applied to the thigh of each participant. After 14 days of continuous wear the accelerometer was removed, the data downloaded and processed with proprietal software using changes in thigh inclination to count STS events.

Results: A heterogeneous group of stroke survivors (n=37) were recruited; they were aged 68.4 years ±13.15, weight 77.12Kg ±22.73, height 1.67m ±0.1, 9 days ±9 post ictus and with a NIHSS (stroke severity) score of 6.4 ±3.3. When separated into two groups, according to the level of assistance required to perform the STS movement, statistically significant (p<0.05) differences were evident, table 1.

Table 1: Daily (24 hours) STS repetitions in whole group and according to assistance.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Daily STS movements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable/required assistance (n=17).</td>
<td>14.29 (16.10)</td>
</tr>
<tr>
<td>Independent with/out an aid (n=20).</td>
<td>34.10 (12.44)</td>
</tr>
<tr>
<td>Whole group (n=37)</td>
<td>25.00 (17.24)</td>
</tr>
</tbody>
</table>
Discussion: The average number of daily STS repetitions, for the whole group, recorded in this study is lower than published reports for frail older people receiving rehabilitation, (mean 36 ±16) and substantially below community living older adults (mean 71, ±25). While perhaps not surprising, these very low levels of STS practice recorded during the rehabilitation period raise questions on whether a training effect could be achieved, particularly for those individuals requiring assistance.

Conclusion: STS movements performed by stroke patients during their rehabilitation period were measured and indicate low levels of practice.
10. **Use of the Theory of Planned Behaviour to understand beliefs of people with stroke about use of Ankle-foot Orthoses (AFOs) (WIP)**

Christine McMonagle¹, Dr. Susan Rasmussen², Dr. Mark Elliott², Robbie Rooney³

¹Department of Biomedical Engineering, University of Strathclyde, ²School of Psychological Sciences and Health, University of Strathclyde
³Orthotic Services Manager, NHS Lanarkshire

**Category**: Research

**Background**
Ankle-foot Orthoses (AFOs) are prescribed to people after stroke to improve mobility. However little is known about AFO use and reasons for non-adherence following stroke. Psychological theories of behaviour can be used to understand AFO use. The aim of this study was to identify beliefs affecting use of AFOs in people with stroke, using the Theory of Planned Behaviour (TPB)[1] as a guiding framework.

**Method**
Participants were 13 people living with stroke who had been prescribed an AFO by NHS Lanarkshire. A 10+3 model was used until data saturation was achieved [2]. Participants were interviewed to elicit beliefs about using AFOs, using a structured questionnaire. Content analysis was used to group the responses into themes.

**Results**
A range of themes consistent with the TPB were elicited. Positive and negative attitudes towards using the AFO included: ‘supports the position of the foot’ and ‘poor style of footwear’. Normative beliefs were influenced by 3 main groups: family, friends and health professionals. Participants reported factors that made the AFO easier to use such as ‘being motivated’ and factors that made the AFO more difficult to use such as ‘challenges in putting the AFO on/ off’.

**Discussion**
The TPB provided a useful framework to investigate beliefs relating to AFO use in people with stroke. A range of beliefs were elicited, relating to attitudes, subjective norms and perceived behavioural control. An understanding of patient beliefs about using orthoses may help allied health professionals to comprehend reasons for non-adherence.
Conclusion
This study used the TPB to identify beliefs about AFO use in people with stroke. The beliefs elicited will be used in a questionnaire to test the efficacy of the TPB in predicting AFO use. This knowledge may allow development of theory based interventions to increase mobility by use of AFOs.

References
11. **Post-Stroke Ankle-Foot Orthoses: Examining Referral Trends in the Scottish Multi-Disciplinary Team**

**CATEGORY:** Research

**AUTHORS:** Eileen Morrow and Roy Bowers (University of Strathclyde, Glasgow).

**BACKGROUND**

Best Practice Statement: Use of Ankle-Foot Orthoses Following Stroke (BPS) asserts ‘any member of the MDT can refer… orthotic assessment’ and ‘survey of clinicians should be conducted to investigate referral trends’.

The aims of this study were 1) assess awareness of the BPS 2) assess referral patterns and trends of the MDT and 3) identify barriers to referral to the Orthotic Service.

**METHODS**

An online survey of clinicians was developed (derived from the BPS, associated papers and discussion with experts) and conducted, inclusion criteria being members of the Scottish Stroke MDT whose current role involves stroke patients.

**RESULTS**

133 responses were analysed. Using Pearson’s Chi Square statistics, statistically significant associations were found between:

- Awareness of BPS and NHS Board Area (North, East, West); \((\chi^2=7.864, \text{df}=2, p=0.020)\)
- Profession and whether clinicians have previously referred to orthotics; \((\chi^2=61.093, \text{df}=4, p<0.001)\)
- Confidence in assessment criteria and profession; \((\chi^2=53.162, \text{df}=4, p<0.001)\)
- Referral to departments other than Orthotics and profession. \((\chi^2=32.475, \text{df}=4, p<0.001)\)

**DISCUSSION**

In relation to study aims:

1) There is higher awareness of the BPS in the West of Scotland than the average, and lower awareness in the East. There is no statistical significance between profession and awareness however physiotherapists have notably high awareness and GPs have low awareness.
2) Nurses, social workers and OTs seldom refer for AFOs; GPs and stroke physicians refer but are not confident in referral criteria; all depend on physiotherapists to assess and refer.

3) The primary barrier to the Orthotic Service was limited knowledge of assessment criteria. Physiotherapists identify different barriers: long waiting lists and a lack of joint clinics.

CONCLUSION

The BPS should be re-disseminated, particularly to East of Scotland and GPs, to improve awareness and confidence in referral criteria. Reduced waiting list times and joint physiotherapist-orthotist clinics may reduce barriers to the Orthotic Service.
12. Improving the knowledge and skills of Community therapists in stroke can enhance community care

Strang DM¹, Cowie S²
NHS Lanarkshire Managed Clinical Network for stroke.
Scotland

Category: Education innovation

Introduction:
Lanarkshire has three acute hospitals. Within these acute sites stroke patients have access to specialist Stroke teams. However, at discharge patient care is transferred to general community teams who have a mixed caseload. This model resulted in patients having an increased response time from referral to intervention and limited access to specialist support. Community teams also reported limited confidence and skill in assessing and treating stroke patients due to their limited experience. The above factors resulted in a secondment for a 0.5 Band 7 Physiotherapist and Occupational Therapist from acute care to the community service. The aim of the project was to establish and enhance knowledge, skills and confidence levels within the community rehabilitation teams in Lanarkshire and address any issues identified.

Method:
The project initially examined the skills, experience and confidence levels of the rehabilitation teams exist across Lanarkshire using a questionnaire approach. The questionnaire examined issues such as knowledge, confidence, skill base, referral trends and perceived training needs.

Results:
The questionnaire found that community therapists had low confidence in the treatment of stroke patients in both physiotherapy and occupational therapy. The community teams had limited experience with stroke making up only 10% of caseloads. More experienced qualified input was often only occurring on a weekly basis. The questionnaire also identified training the needs for therapists and a model of education and supervised clinical training was established for all rehabilitation staff.

Conclusion:
Community therapists often have small stroke caseloads that limit clinical skill development and experience. A model of educational and clinical skills training has been developed to
improve the level of care experienced by stroke patients in the community. Future plans include identifying one person within a community team as having a stroke interest and developing their skills through education and supervised clinical training. This person would then help to develop the rest of the team.
13. Using individual patient data (IPD) to create an international aphasia dataset for the REhabilitation and recovery of peopLE with Aphasia after StrokE (RELEASE) project. WIP.

Authors:
Williams, Louise R¹, Ali, Myzoon¹, VandenBerg, Kathryn¹, Godwin, Jon², Elders, Andrew¹, Becker, Frank³ Bowen, Audrey⁴, Breitenstein, Caterina⁵, Gandolfi, Marialuisa⁶, Godecke, Erin⁷, Hilari, Katerina³ Hinckley, Jacqueline⁹, Horton, Simon¹⁰, Howard, David¹¹, Jesus, Luis, M.T.¹² Jungblut, M¹³, Kambanaros, Maria¹⁴, Kukkonen, Tarja¹⁵, Laska, Ann-Charlotte¹⁶, MacWhinney, Brian¹⁷, Martins, Isabel, P¹⁸, Mattioli, Flavia¹⁹, Meinzer, Marcus²⁰, Palmer, Rebecca²¹, Patricio, Brigida²², Price, Cathy²³, Szafierski, Jerzy P²⁴, Thomas, Shirley²⁵, van der Meulen, Ineke²⁶, Visch-Brink, Evy²⁷, Worrall, Linda²⁸, Brady, Marian C¹ on behalf of the RELEASE Collaborators.

1 NMAHP Research Unit, Glasgow Caledonian University
2 Glasgow Caledonian University
3 University of Oslo Sunnaas Rehabilitation Hospital
4 University of Manchester
5 University of Muenster
6 University of Verona
7 Edith Cowan University
8 City University London
9 University of South Florida
10 University of East Anglia
11 Newcastle University
12 University of Aveiro
13 Interdisciplinary Institute for Music and Speech Therapy, Germany
14 Cyprus University of Technology
15 University of Tampere
16 Karolinska Institute
17 Carnegie Mellon University
18 University of Lisbon
19 Spedali Civili, Brescia
20 University of Queensland
21 University of Sheffield
22 Polytechnic Institute of Porto
23 University College London
24 University of Alabama at Birmingham
25 University of Nottingham
26 Rotterdam en omgeving
27 Erasmus University Rotterdam
28 University of Queensland

Category: Research

Background:
Approximately 5.6 million stroke survivors worldwide acquire aphasia annually. Aphasia impairs speech (comprehension and expression) reading and writing, impacting on social interaction and emotional wellbeing. Speech and language therapy assists language recovery. The RELEASE study investigates the specific person, stroke, aphasia and
intervention factors which best predict recovery by collaborating with researchers internationally in this NIHR funded (HS&DR 14/04/22) project.

**Method:**
Aphasia researchers are identified through the EU COST funded Collaboration of Aphasia Trialists and a systematic search of the literature [Cochrane Stroke Group Trials, MEDLINE, CINAHL, AMED, Cochrane Library Databases (CDSR, DARE, CENTRAL, HTA), EMBASE, LLBA and SpeechBITE ] and invited to collaborate and contribute IPD datasets. A minimum of 10 post-stroke aphasia participants, aphasia severity information and time post-stroke are required.

**Results:**
Currently (June, 2016) our database includes 2,531 IPD from 11 countries (33 datasets, 9 which were in the public domain). The systematic search retrieved 5,272 records (of which we excluded 75 duplicates, 2,395 reference titles and 965 abstracts). Recruitment of additional datasets is ongoing and expressions of interest in collaboration are welcome.

**Discussion:**
International collaboration requires time for intellectual property and other contractual agreements, ethical consents may also differ. Constructing data management systems which enable IPD across different countries, languages and research groups to be efficiently processed and maintained is demanding but attainable. To assess language recovery with no geographical or language restrictions international collaboration and multifaceted expertise is essential. The wide variety of variables and outcome measures in post-stroke aphasia data is challenging.

**Conclusion:**
Creating a substantial, international database of post-stroke aphasia IPD enables us to examine the natural history of language recovery, the aspects of effective aphasia therapies such as frequency, duration, intensity and timing; and to determine which stroke survivor, aphasia and stroke related factors best predict recovery.