

## Review Article

# CONTEXT AND TASK RELATED APPROACH IN REHABILITATION AFTER STROKE: A SYSTEMATIC REVIEW

Parneet Kaur Bedi <sup>\*1</sup>, Narkeesh Arumugam <sup>2</sup>, Kanimozhi <sup>3</sup>.

<sup>\*1</sup> Research Scholar, <sup>2</sup> Professor & Head, <sup>3</sup> Clinical Physiotherapist.

Department of Physiotherapy, Punjabi University Patiala. India.

## ABSTRACT

**Background:** Stroke is one of the leading causes of death and disability in both the developing and developed nations of the world. Stroke rehabilitation is an organized endeavor to help patients to maximize all opportunities for returning to an active lifestyle<sup>1</sup>. Neuro-rehabilitation is a method for relearning a previously learned task in a different way, either by compensatory strategies or by adaptively recruiting alternative pathways. There are several different approaches to physiotherapy treatment after stroke. These can broadly be divided into approaches that are based on neurophysiological, motor learning, or orthopedic principles. Some physiotherapists base their treatment on a single approach, whereas others use a mixture of components from a number of different approaches<sup>10</sup>. Neurological rehabilitation and the contribution of physical therapy have changed considerably over the past decades as scientific and technological developments have enabled greater understanding of brain reorganization and the mechanisms of motor control, motor performance, impairments and adaptations.

**Aim:** This paper is a report of a review conducted to provide an overview of the evidence in the literature on the effect of Context and Task related approach in management stroke survivors.

**Data Sources:** A range of databases was searched to identify papers addressing Context and Task related approach in stroke rehabilitation, including PubMed, Cochrane Library of systematic reviews, ICMR database and various online journals of Stroke and Physiotherapy. The selected papers were assessed for quality. Important characteristics and outcomes were extracted and summarized.

**Results:** Studies of Context and Task related showed benefits for functional outcome in stroke survivors. Active use of task-oriented training with stroke survivors will lead to improvements in functional outcomes and overall health related quality of life.

**Conclusion:** Clinical practice in neuro-rehabilitation continues to vary widely and depends largely on the preferred approach of the individual therapist and on the continuing dominance of therapeutic methods developed half a century ago. Physiotherapists need to embrace the responsibility of using evidence-based, or at least scientifically acceptable, methods of intervention and objective measurements of outcome.

**KEYWORDS:** -rehabilitation; functional outcome; Context and Task related approach.

**Address for correspondence:** Dr. Narkeesh Arumugam, Professor & Head, Department of Physiotherapy, Punjabi University Patiala. India. **Email:** narkeesh@gmail.com

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## INTRODUCTION

Among all the neurologic diseases of adult life, the cerebrovascular ones clearly rank first in frequency and importance. At least 50 percent of the neurological disorders in a general hospital are of this type. Disorders of the cerebral circulation are the commonest neurological disorders of the middle age and the old age

because the cells of the brain can only function for a few minutes at the most if their oxygen or glucose supply is reduced below a critical level.<sup>2</sup> Stroke, the lay term for a vascular incident causing disability, whether occlusive or hemorrhagic, afflicts about millions of our population and a quarter of these are below the age of 65 years.<sup>3</sup>

Stroke is the third leading cause of death and the most common cause of disability among the adults in United States. A recent study mentioned that approximately 20 million people each year will suffer from stroke and of these 5 million will not survive<sup>4</sup>. Developing countries account for 85% of global deaths from stroke<sup>5</sup>. Stroke is also a leading cause of functional impairments, with 20% of survivors requiring institutional care after 3 months and 15% - 30% being permanently disabled<sup>6</sup>. Stroke is a life-changing event that affects not only the person who may be disabled, but their family and caregivers. Utility analysis shows that a major stroke is viewed by more than half of those at risk as being worse than death<sup>6</sup>. Effective screening, evaluation, and management strategies for stroke are well established in high-income countries<sup>7</sup>, but these strategies have not been fully implemented in India.<sup>8</sup>

During the past two decades, major progress in neuroscience has resulted in novel concepts for rehabilitation interventions after stroke. Various studies support the choice of task-oriented training. Neuro-imaging studies in animals and humans have provided strong evidence for changed activation patterns in many parts of the damaged brain<sup>9,10,11</sup>. There are strong indications that functional recovery is not only the result of restoration from impairments.

### **Definition of Context and Task Related Training**

Unfortunately, no conclusive definition of a Context and task-related approach exists in the literature. In the task-oriented approach, movement emerges as an interaction between many systems in the brain and is organized around a goal and constrained by the environment<sup>12</sup>. Task-oriented training includes a wide range of interventions such as treadmill training, walking training on the ground, bicycling programs, endurance training and circuit training, sit-to-stand exercises, and reaching tasks for improving balance. In addition, use is made of arm training using functional tasks such as grasping objects, constraint-induced (movement) therapy (CIMT) and mental imagery. Such training is task and patient focused and not therapist focused. As well as the content of the therapy, the optimal amount of therapy needed for patients after stroke is not exactly

known. The time spent in exercise programs is often decided pragmatically and is not based on the time necessary to learn a given skill.<sup>13</sup> A well-coordinated and organized multidisciplinary rehabilitation program, beginning as soon as possible after stroke, is important for an effective stroke unit.<sup>1,14</sup> Therefore, Physiotherapists are key members of the stroke team and their input is essential for achieving set rehabilitation goals.

## **REVIEW**

**Aim:** This paper is a report of a review conducted to provide an overview of the evidence in the literature on the effect of Context and Task related approach in management stroke survivors.

**Design:** Literature was systematically reviewed following the steps of PICO and PRISMA<sup>17</sup> statement.

**Search methods:** First the databases were searched for the search terms: "Task specific" and "Task oriented". And then the two terms were combined using Boolean logic "or". The two terms were combined with Stroke and cerebrovascular incident.

**Inclusion criteria:** Stroke survivors (acute, rehabilitation and community phase). Both ischemic and haemorrhagic stroke, functional based /Activities of Daily Living as outcome measures. Only studies with intervention based as task specific or task related approach were used.

**Review design:** Meta- analysis, Randomized Control Trials (RCTs), Systematic reviews.

**Publication date:** articles published in English language between January 2003 to January 2013.

### **Search outcome**

The search strategy generated 56 papers. After considering the titles and inclusion criteria 22 papers were taken for full article evaluation to be done according to PICO and PRISMA 2009 guidelines. (Table 1)

**Quality appraisal** was done according to the 27 item checklist provided in PRISMA guidelines. In the final dataset there were 5 systematic reviews, 1 Meta-analysis, 1 Cochrane review and 9 RCTs.

**Table 2: Summary of Articles Used in the Review.**

S.No	Author and year	Study design	Interventions and Outcome measures	Conclusion
1	Ching-yi Wu (2003)	n=27 RCT	Repeated measure design four experimental levels were used	Significant and large effects of functional goals and personal preference were found in the variables of movement time and reaction time.
2	Van Peppen et al. 2004	Systematic review 151 studies, 123 RCTs and 28 CCT	Impact of physical therapy on functional outcomes after stroke.	Strong evidence in favour of task-oriented training to restore balance and gait and for strengthening the paretic limb. SES high intensity exercise training 0.13 95% CI 0.03–0.23. Insufficient evidence in functional outcome for traditional neurological treatment approaches
3	Saunders et al. (2004)	Cochrane review 12 trials, Total n = 289 RCT-n=12	Physical fitness training for stroke survivors	Statistically significant improvement was observed only in FAC scores and max. walking speed after walking training, standardized mean diff. 0.42 m/s 95% CI 0.04–0.79. Any training induced benefit appear to be associated with specific or task related training
4	Thielman et al. (2004)	RCT ,n=12	Training paretic limb; task related and progressive resistance 4 weeks/12 *35 min/150-180 movement session. Kinematic analysis, MAS, Rivermead assessment scale	No statistical significant effect for the MAS. Low level patients showed better performance
5	Blennerhassett and Dite (2004)	n = 30 RCT single blinded clinical trial Exp.	n = 30 RCT single blinded clinical trial Exp. n=15	Mobility group: 6 MWT trend to walk further P < 0.01. TUG P < 0.02. Task related training effects were found
6	Salbach et al. (2004)	n = 91 RCT Exp. n = 44	6MWT, 5-meter speed, TUG, BBS	Between group difference was 35 m on the 6MWT, TUG no difference
7	Salbach et al. 2005	n = 91 RCT Exp. n = 44	6MWT, 5-meter comfortable walking speed, TUG. BBS, ABC	Walking intervention group; change in balance efficacy correlated with change in functional walking capacity
8	Michaelson et al. (2005)	n=30 RCT double blinded	Fugl-Meyer arm section and function & movement Kinematics	Intervention group showed greater improvements in arm function compared with control group
9	Bayona et al. (2005)	Systematic review	A focus on role of task related rehabilitation therapies.	Task-specific activities and activities that are meaningful to the person have been shown to produce cortical reorganization and associated functional improvements.
10	Carr JH and Shepherd RB (2006)	Systematic review	Paper presents a historical perspective of stroke rehabilitation covering the last half-century.	Findings in both animal and human models suggest that, for rehabilitation to be effective in optimizing neural reorganization and functional recovery, increased emphasis needs to be placed on challenging, engaging and meaningful task training, to promote learning.
11	Bayouk et al. (2006)	n = 16 RCT Exp. n = 8	1. Measurement COP displacement under 4 sensory conditions. 2. 10 m walking test	Both groups improved statistically significantly on the 10 m walking test (P < 0.05). Exp. group performed better in standing double legged with eyes open on a normal and soft surface (P < 0.05)

12	Yang et al. (2006)	n = 44 RCT Exp. n = 24	Muscle strength, gait performance on a instrumented walkway, 6MWT, step test, TUG	All selected tests improved statistically significant (P < 0.001). With exception of the step test. Strength gain associated with gain in functional tests (P < 0.001)
13	Van de Port et al.(2007)	12 studies out of 246 studies, Total n=501	Exercise training programs on walking competency after stroke	Strong evidence was found for improved functional mobility after gait-oriented training (SES fixed 0.45 CI 0.27-0.63) Findings provide strong evidence that standing balance, (I) ADL or QoL not statistically significant more improved than by conventional care.
14	Shamay S.M et al (2007)	RCT n= 88 Divided into 4 groups	Composite Spasticity Scale, peak torques generated during maximum isometric voluntary contraction of ankle dorsiflexors and plantarflexors, and gait velocity recorded at baseline, after 2 and 4 weeks of treatment, and 4 weeks after treatment ended	On comparison with TENS, Combined TENS+TRT group showed significantly greater improvement in ankle dorsiflexion torque at follow-up and in ankle plantar flexion torque at week 2 and follow-up (P<0.01). When compared with placeboTRT, the TENSTRT group produced earlier and greater reduction of plantar flexor spasticity and improvement in ankle dorsiflexion torque at week 2 (P<0.01). When compared with all 3 groups, the TENS+TRT group showed significantly greater improvement in gait velocity (P<0.01).
15	Wevers L et al.(2008)	Meta -analysis	TUG,6MWT,timed up and go test, Gait speed	supports the use of task-oriented circuit class training to improve gait and gait-related activities in patients with chronic stroke
16	Johansson BB.(2011)	Systematic review	A focus on current trends in stroke rehabilitation.	Stroke units that combine good medical and nursing care with task-oriented intense training in an environment that provides confidence, stimulation and motivation significantly improve outcome.

**Table 3:** Possible interventions in context and task related approach.

Intervention	Physiotherapists may use the following activities	Positively influences
Balance exercises	Assist patients with implicitly balance exercises, during sit-to-stand, dressing	Improves balance, self-efficacy
Sit and reach	Putting objects further away than arm length so that patients need to reach for an object	Sitting balance
Sit to	stand Exercise sit-to-stand a few times a day, from chairs with different heights	Sit to stand, balance. May decrease number of falls
Walking	Walk patients with or without help (in a safe situation)	May improve walking ability, walking speed and endurance
Arm training	Activate the paretic arm and hand. Exercise repetitive functional, meaningful tasks that are chosen by the patient For example: self-care tasks, reading a book, eating	Improves arm function especially in patients with some arm and hand function. Improves self-care

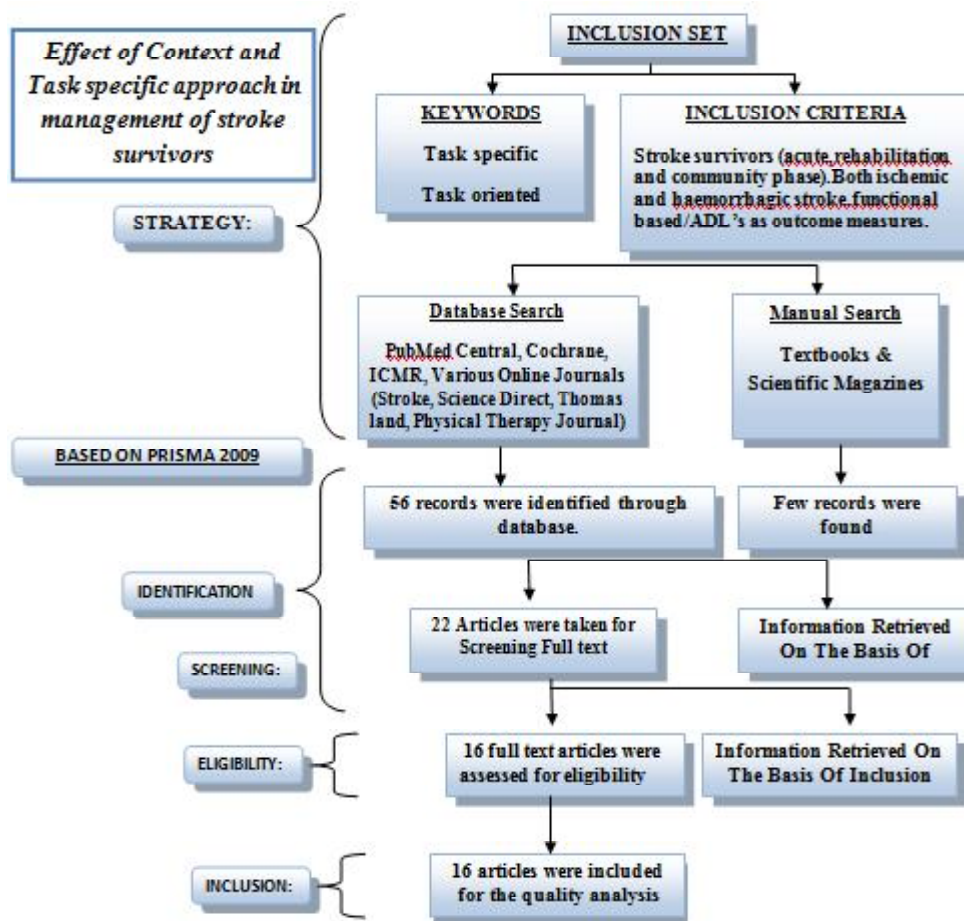
### Synthesis

The studies included differed markedly with regard to interventions, methodology, outcome measures, patient characteristics and methodological quality. Also, the phase after stroke and the setting of the study differed. The studies were performed in the (sub)-acute phase and chronic phase. Because of these differences it was not possible to conduct meta-analyses pooling the results of the various task-oriented training interventions, and so the findings are reported using a narrative summary technique.

### DISCUSSION

This review shows important evidence in favour of context and task related training in stroke rehabilitation. In this systematic review, we found various interventions that proved to have important effects on patient outcomes. Generally, exercise tasks need to be specific, and should be practiced as meaningful tasks<sup>15</sup>. Studies of task related therapies showed benefits for functional outcome. It makes intuitive sense that the best way to relearn a given task is to train specifically

**Table 1:** Search and review strategy Prisma 2009.



for that task. Repetition alone, without usefulness or meaning in terms of function, is not enough to produce increased motor cortical representations. In humans, less intense but task-specific training regimens with the more affected limb can produce cortical reorganization and associated meaningful functional improvements.

The studies summarized in the table 1 highlight the evidence of role and effectiveness of Context and task related approach in stroke rehabilitation.

There are no standardized functional tasks, and so therapists are challenged to construct meaningful tasks. The challenge is to increase the therapeutic input of therapists and other professionals in a time of staff shortages and cost restriction<sup>16</sup>. Possible interventions are summarized in Table 3.

Commitment of the leaders is essential if changes in practice are to be accomplished and support is particularly needed in relation to time, education and therapeutic space in a department. The present review has highlighted many

factors to consider in future investigations measuring the effects of task-oriented interventions within physiotherapy practice. The question is not if, but how nurses can incorporate context and task-oriented training into daily care of stroke survivors.

### CONCLUSION

Generally, task-oriented rehabilitation after stroke has proved to be effective and relevant for rehabilitation of stroke survivors. Improvement of impairments has long been seen as a prerequisite for functional movement, but interventions to achieve such improvement do not intrinsically carry over to functional improvement as the correlation between functional and laboratory measures is generally weak. Physiotherapy plays an important role in the process of stroke rehabilitation. As a part of the interdisciplinary team, physiotherapists work in concert with the managing doctor and other rehabilitation specialists to provide stroke patients with a comprehensive rehabilitation program. The physiotherapy stroke rehabilitation program involves a dynamic process of

assessment, goal-setting, treatment and evaluation; its coverage spans from the acute stage, through the rehabilitation stage, to the community stage. The aims of physiotherapy interventions are to promote motor recovery, optimize sensory functions, enhance functional independence, and prevent secondary complications. However what matters the most is the treatment plan of the patient. Each patient has its own unique list of abilities and inabilities, the treatment plan thus, should be individualized. Unfortunately, a recipe for acute multidisciplinary care following stroke cannot be given, as each patient presents with a different range of impairments and different levels of activity and participation. In addition, patients will all identify individual priorities for intervention according to their own needs, backgrounds, experience and culture. Optimal functional recovery is the ultimate aim of neuro-rehabilitation after an acute brain lesion. The key concept is of context and task related approach i.e planning a of treatment plan according to the needs and requirements of the patient. In Indian clinical scenario, there are wide variations in the rehabilitation process both in terms of content and context. But overall, the whole rehabilitation process revolves around the core elements of ICF model. The Physiotherapists need to embrace the responsibility of using evidence-based, or at least scientifically acceptable, methods of intervention and objective measurements of outcome.

**Conflicts of interest:** None

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