S&S

Senses Sci 2018: 5 (3)617-634
doi: 10.14616/sands- 2018- 5- 617634

Article

Intervention of Occupational Therapy in patient with Stroke in acute phase: Systematic Review

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Received: 6 September 2018; Accepted: 21 September 2018; Published: 30 September 2018

Abstract. *Objective*: the objective of this work was both to fill this gap in the scientific literature, and to evaluate the results of an Occupational Therapy treatment in individuals affected by an acute phase stroke, taking into account Randomized Controlled Trial (RCT).

Methods: a systematic review was carried out according to PRISMA guidelines. Three bibliographic databases were searched, namely MEDLINE, CINAHL and PEDro. The minimal prerequisites included in existing papers on such systematic reviews were: (a) Randomized Controlled Trial, (b) published in English (c) during the last ten years (2006 -2016). Studies were evaluated according to Jadad Score.

Results: 12 studies were included. Selected papers showed an average Jadad score of 2,15.

Conclusions: the review suggests that so far there is not a more effective treatment in comparison to others; moreover, available studies lack available samples and overall show to have a poor Jadad score. Nevertheless, a number of suggestive results emerged by the study carried out. Occupational therapists shall perform and report higher quality clinical studies as well as an increased evidence level with the aim to build up a trustworthy arsenal of evidence-based interventions for people with acute stroke.

Keywords: Occupational Therapy, acute stroke, rehabilitation, systematic review, stroke.

Introduction

A stroke is defined as a sudden appearance of signs and/or referable symptoms of a focal or global deficit (coma) of cerebral functions that are lasting more than 24 hours, or to inauspicious results attributable to cerebral vasculopathy (Ictus Celebrale, 2016).

Every year worldwide about 15 million people are affected by stroke. About 6 millions almost die, while 5 millions develop permanent disability. At world level stroke is the second cause of death for people over 60 years old, and the second cause of disability after the insanity (Stroke World Heart Federation 2016).

In Italy stroke represents the third cause of death, after cardiovascular illnesses and neoplasms (10-12% of the deaths in one year are due to stroke), and it is the first cause of disability. Every year in Italy about 185,000 people are affected by stroke: about 150,000 are new cases while about 35,000 are strokes which occur after a first episode. The incidence is proportional to the age of the population; it is quite low up to 40-45 years old, then it gradually increases in the population 70 years old and up. It is estimated, in fact, that about 75% of stroke cases affect individuals older than 65 years (Humanitas research hospital, 2016). The stroke rate is prevalent in the population between 65 and 84 years old with a rate about 6,5% among sexes, which becomes 7,4% for males and 5,9% for women (ATORN , 2016).

About 10 to 20% of the people affected by stroke for the first time dies within one month, while another 10% dies within the first year. Among individuals who survive after one year, nearly one third develops an elevated degree of disability (lack or absence of autonomy in daily life), one third experiences a light or moderated degree of disability that often allows a partial return to their own domicile and, finally, the last third, i.e. those people who have been affected by stroke without damages, return to their own domicile independently (Humanitas Research Hospital, 2016).

Finally, stroke also represents the first cause of disability in the elderly with a significant individual, family and social impact. In 93% of the cases the functionality of the superior limb is lost, while 40% recovers only the basic Activity of Daily Living (ADL). In 56% of the cases a serious paresis of the superior limbs persists; while 37% of the cases partially recovers, only in 7% there is a complete resolution. The greatest part of the recovery of the superior limbs occurs in the first 3 months. A poor recovery is often correlated to a prolonged period of hospitalization that leads to a worst prognosis for quality of life (Mayo et al., 1999).

Literature shows that stroke has a definite social impact burdening above all families, with caregivers having to cohabitate with patients in 66,2% of the cases, spending about 6,9 hours in a day for direct care.

The team approach in patients with acute stroke in the early days after the event appears to be essential for the improvement of the activities of daily life. A special mention is the need for a joint work between nurses and occupational therapists that would improve all aspects of personal hygiene and daily activities of life lost by the patient after the event.

According to the best knowledge of authors, there is no systematic review focused on occupational therapy treatments in patients affected by stroke in acute phase. Occupational

therapists need to have a wide spectrum of robust evidence in order to select the best treatment to deliver to their patients.

It is worth noticing that a considerable number of rehabilitation approaches, for patients affected by a stroke, are used within the first 10 days from the event.

The most common are:

-The Constraint-Induced Movement therapy (CIMT) is a form of rehabilitation focused on the recovery of the superior limbs based on the forced use of the impacted limb while immobilizing the against-side one with a splint. The CIMT was developed for improving the motor function of the superior limb after a stroke (Thrane et al., 2015).

-The Bimanual Therapy is, instead, a new approach based on structuring activities to improve the abilities of coordination, usage and strength of superior limbs. In order to improve the control and the functionality of the impacted limb, patients are requested to carry out the same activities with both the superior limbs at the same time (Morris et al., 2008).

-The Mirror Therapy was originated from one of the most important discoveries of the last ten years in neurosciences: the mirror neurons. The mirror neurons react to the actions that are observed in the others and they are equally activated when we are performing a specific action. (Acharya et al., 2019, Diretta et al. 2014).

-The Perfetti's Cognitive Sensory Motor Training Therapy (cognitive therapeutic exercise) is based on the sensorial rehabilitation with a specific evidence of the superior limbs (Chanubol et al., 2012).

The objective of this review, according to PRISMA guidelines, is to clarify which occupational therapy treatments are best in patients with stroke in the acute phase by analysing RCTs. (PICOS).

Materials and Methods

Strategy of research

In order to carry out the review, a PRISMA checklist was used (Liberati et al., 2009). This activity was developed through systematic review in double blind approach. Three electronic database were searched MEDLINE, CINAHL and PEDro.

The following keywords were used

- "stroke" and "rehabilitation" (MeSH);
- (Strokes) OR (Apoplexy) OR (CVA (Cerebrovascular Accident)) OR (CVAs (Cerebrovascular Accident)) OR (Cerebrovascular Accident) OR (Cerebrovascular Accidents) OR (Cerebrovascular Apoplexy) OR (Apoplexy, Cerebrovascular) OR (Cerebrovascular Stroke) OR (Cerebrovascular Strokes) OR (Stroke, Cerebrovascular) OR (Strokes, Cerebrovascular) OR (Vascular Accident, Brain) OR (Brain Vascular Accident) OR (Brain Vascular Accidents) OR (Vascular Accidents, Brain) OR (Cerebral Stroke) OR (Cerebral Strokes) OR (Stroke, Cerebra) OR (Strokes, Cerebral) OR (Stroke, Acute) OR (Acute Stroke) OR (Acute Strokes) OR (Strokes, Acute) OR (Cerebrovascular Accident,

Acute) OR (Acute Cerebrovascular Accident) OR (Acute Cerebrovascular Accidents) OR (Cerebrovascular Accidents, Acute) AND (Occupational Therapy).

The bibliographical search was performed with a due date set to February 20th 2016. The minimal prerequisites included in existing papers in such systematic reviews were: (a) Randomized Controlled Trial, (b) studies about Occupational Therapy rehabilitation techniques, (c) published in English during the last ten years (2006 -2016).

All selected papers were evaluated using the Jadad scale (Clark et al., 1999), a necessary tool used to appraise the methodological quality of Randomized Controlled Trials (RCTs). The Jadad scale analyses the adequacy of randomization, double blind and loss to the follow-up. The total score can vary from 0 to 5, and an RCT with a value higher or equal to 3 is considered a good quality one.

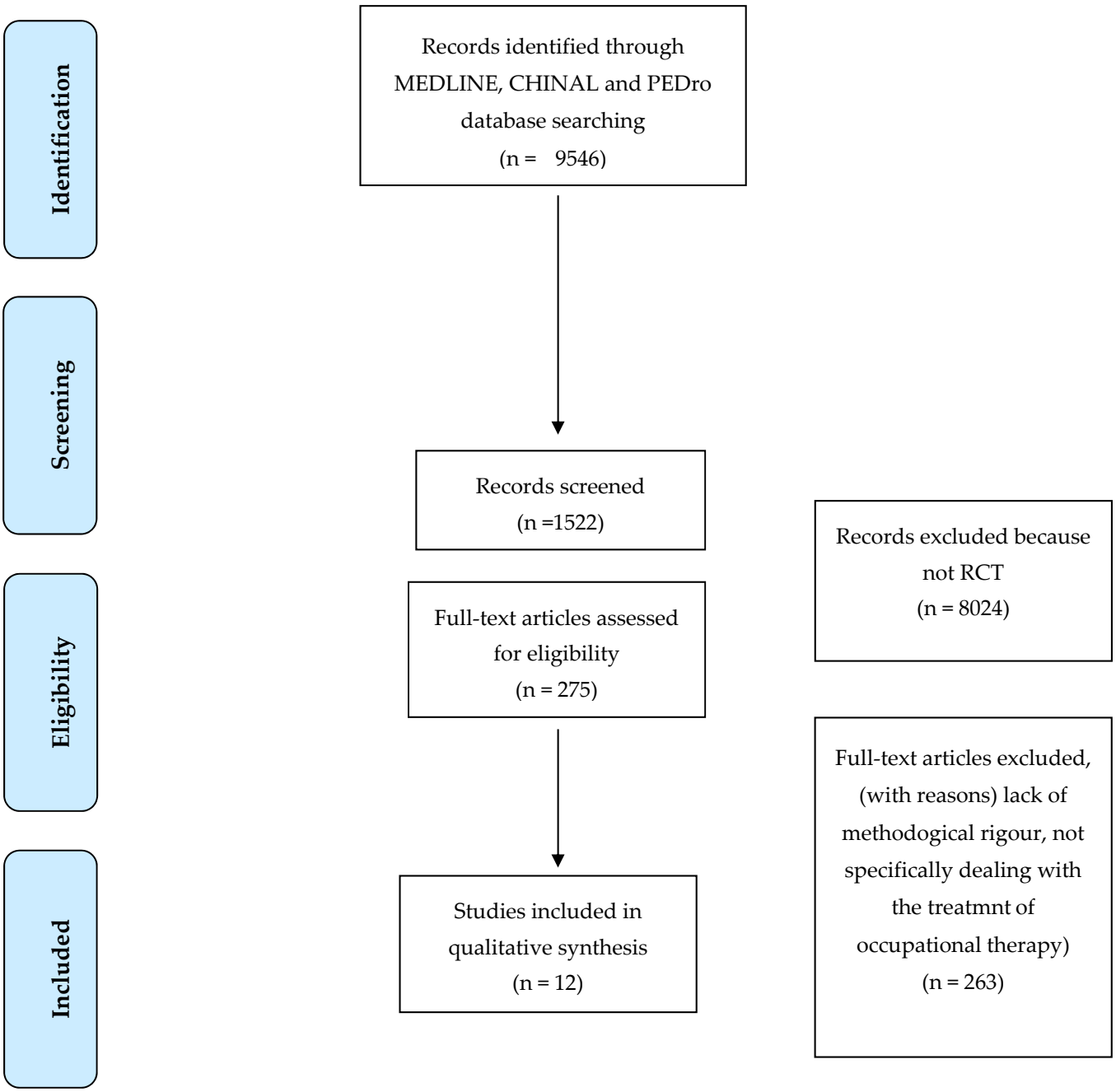
Data items

The following aspects were analysed in the included studies: samples, average age of the participants, interventions, type and dosing of the therapeutic treatment for both groups, follow-up, measurements outcomes, and Jadad score.

Results

The total number of articles retrieved (MEDLINE/ CINAHL and PEDro) was 9546, of those 8024 have been excluded after reading titles and abstracts, as they were not RCTs. In the remaining 1522 articles, only 275 were selected by reading titles and abstracts. The reading of the full-text of these papers further reduced the number of selected articles from 275 to only 12 (**Figure 1**).

Figure 1 - Flow Chart



A total of 12 articles was selected at the end, after removing duplicates, and these 12 studies were all Randomized Controlled Trials (RCT) published in English language (**Table 1**).

Table 1

Author	Participants details	Interventions	Rates of treatment	Control group	OUTCOME Measure tools used	Follow-up	Conclusions	Jadad score
Liu, 2014	N= SG 24 CG 20 M 22 F 22 Mean age SG 69.7±6 CG 72.30±9.90 Days post stroke SG 13.80 (8.20) CG 12.90 (6.80)	Self Regulation	5 hours	Functional rehabilitation	Likert Scale, F.I.M., F.M.A.		The treatment improves the performance of the patients and the motor and cognitive skills, with P <.001 as regards the results of the FIM and FMA.	3
Sundseth 2014	N=52 SG 27 CG 25 Mean age 76.4±9.4 Days post stroke 7.5 hours	Very early mobilization <24 hours of admittance		Mobilization between 24 and 48 hours of admittance	N.I.H.S.S., mRS	3 months	There are no significant differences.	1
Sundseth 2012	N=56 SG 27 CG 29 Mean age 76.4±9.4 Days post stroke	Very early mobilization <24 hours of admittance		Mobilization between 24 and 48 hours of admittance	N.I.H.S.S, mRS, B.I.	3 months	It identified a trend toward poor outcome, death rate and dependency among patients mobilized within 24	3

	>24 hours						hours after hospitalization, and an improvement in neurological functioning in favor of patients mobilized between 24 and 48 hours. Very early or delayed mobilization after acute stroke is still undergoing debate, and results from larger trials are required.	
Chanubo 2012	N=SG 20 CG 20 M 20 F 20 Mean age SG 63.2±10.1 CG 60±10.8 Days post stroke <14 days	Perfetti's Cognitive Sensory Motor Training Therapy	10 hours	Conventional Occupational Therapy	A.R.A.T. , B.B.T., E.B.I.		There are no significant differences. Regarding patients with severe paretic arm, Perfetti's method results in statistically significant improvements in recovery over that of conventional therapy P=0.02 (A.R.A.T.).	3

Da Silvia Cameirao 2011	N= SG 10 CG 4 M 6 F 8 Mean age SG 63 11 CG 5814 Days post stroke <21 days	Rehabilitation Gaming System	12 hours	Non-specific interactive games	B.I. , Motricity Index, F.M.A., Medical Research Council Grade, Chedoke Arm and Hand Activity Inventory	1,3 e 6 months	It observed that RGS group (SG) performed better as compared to controls in both the speed of the paretic arm and the scores on a number of clinical scales.	2
Burgar 2011	N= SG 19 CG 18 Mean age SG 62.5(2.0) CG 68.1(3.3) Days post stroke SG 17.3 2.7 CG 10.6 1.2	Low-dose of Robot-Assisted upper-limb therapy with the Mirror Image Movement Enabler	15 hours	Conventional Treatment	F.M.A. F.M.I., W.M.F.T., Motor Power, Ashworth scores	6 months	Results of the primary outcomes were not significant. There is a significant correlation at discharge between the FIM gains and the dose and intensity of Robot Assisted therapy (P <.05).	2
Dromerik 2009	36 SG 19 CG 17 63.9(14) days post stroke 9.7 (4.6)	Low Constraint-induced-movement therapy	20 hours	Traditional Occupational Therapy	A.R.A.T. , F.I.M. , The Stroke Impact Scale	3 months	CIMT was equally as effective but non superior to an equal dose of traditional Occupational Therapy.	1
Liu 2009	35 SG 18 CG 17 SG 70.8(9.3) CG 69.7(7.4) Days post stroke	Mental Imagery	15 hours	Standard treatment	Performance analysis		The mental imagery intervention was useful for improving patients' ability on performing the tasks which they did not	2

	SG 12.3 (7.4) CG 12.2 (5.1)						previously trained on and in places different from the training environments.	
Rabadi 2008	20 SG 10 CG 10 M 14 F 6 SG 69.2 (10.22) CG 67.80 (12.66) Days post stroke SG 22.50(15.11) CG 22.50(18.22)	The Monark Arm Ergometer	8 hours	Occupational Therapy	F.M.A. Motor Status Scale, F.I.M.		All activity-based arm training programmes and occupational therapy were equally effective in decreasing impairment and improving upper extremity motor function.	2
Morris 2008	106 SG 56 CG 50 M 61 F 45 SG 67.9 (13.1) CG 67.8(9.9) Days post stroke from 14 to 28 days	Bilateral Upper Limb Task Training	10 hours	Unilateral Upper Limb Task Training	A.R.A.T., Rivermead Motor Assessment upper limb scale, Nine Hole Peg Test	4,5 months	Bilateral training was no more effective than unilateral training; there are no significant short-term differences. To follow up the bilateral training group had significantly less improvement in dexterity.	3

Boake 2007	23 SG 10 CG 10 M 15 F 8 SG 63.1 (14.3) CG 58.9 (14.0) Days post stroke 11 days	Constraint-Induced Movement Therapy	36 hours	Traditional therapy	F.M.A., Grooved Pegboard Test, Motor Activity Log	3 months	Between the two treatments, there are no significant differences in long-term improvements. The patients who received CIMT showed an apparent advantageous trend as regards the measures of motor function and an improvement in quality of performing ADL using the affected arm and hand.	2
Thrane 2015	47 SG 24 CG 23 M 36 F 11 63.2 (11.9) Days post stroke SG 16.6 (7.2) CG 18.0 (6.5)	Constraint-Induced Movement Therapy	30 hours	Standard Treatment	W.M.F.T, F.M.A., Nine Hole Peg Test, Stroke impact Scale	6 months	There are no significant differences, but the scores of the Wolf Motor Function tests have a better trend than patients in the control group, which shows that CIMT can promote a faster recovery than the standard treatment.	3

The days from the stroke event have been varying from 7,5 hours (Sundseth et al., 2014) to 22 days (Rabadi et al., 2008); samples vary from a minimum of 14 individuals (Da Silva Cameirao et al., 2011) to a maximum of 106 patients (Morris et al., 2008). Male samples are proportionate to the female ones. Only in 3 studies the male samples are larger (Thrane et al., 2015, Morris et al., 2008, Boake et al., 2007). Age of the samples varied from 60 to 80 years old.
The experimental treatments were the followings:

- Self Regulation, Very early mobilization 24 hours from the admission (Sundseth et al., 2014, 2012)
- Perfetti's Cognitive Sensory Motor Training Therapy (Chanubol et al., 2012);
- Rehabilitation Gaming System (Da Silva Cameirao et al., 2011) robot-Assisted therapy of the superior limb with Mirror Image Movement Enabler by also comparing this treatment to higher dosing and lower dosing (Burgar et al, 2011), the Constraint-induced-movement therapy (Thrane et al., 2015, Moher et al., Boake et al, 2007);
- In the study (Dromerick et al., 2009) high and low dosing of this treatment is compared;
- The Motor Imagery (Liu et al., 2009);
- The Monark Arm Ergometer and Robot Aided therapy (Mit-Manus) (Rabadi et al., 2008);
- Bilateral Upper Limb Task Training (Morris et al., 2008).
-

As control treatment, the followings were used:

- Conventional Occupational Therapy in 4 studies (Chanubol et al., 2012, Da Silva Cameirao et al., 2011, Dromerick et al, 2009, Rabadi et al, 2008);
- Standard treatment in 4 studies (Trane et al., 2015, Burgar et al., 2011, Liu et al., 2009, Boake et al., 2007);
- Mobilization between 24 and 48 hours from the admission in 2 studies (Sundseth et al., 2012, 2014);
- Not specific interactive games in a study (Da Silva Cameirao, et al., 2011);
- Unilateral Upper Limb Task Training in a study (Morris et al., 2008).

Treatments last a minimum of 5 hours (Liu et al., 2014) to 36 hours (Boake et al., 2007); this measurement, however, is not a fully reliable datum as in some studies, such as the Constraint-induced-movement, the patients perform the therapy while wearing a glove for the 90% of the time in which he/she is awake during the day (Thrane et al., 2015, Dromerick et al., 2009), which unfortunately cannot be quantified even if these times belong to the treatment.

The outcomes of these studies were several and varied greatly, and they were mainly used to appraise the effectiveness of the treatment of occupational therapy.
In six studies (Thrane et al., 2015, Liu et al., 2014, Da Silva Cameirao et al., 2011, Burgar et al., 2011, Liu et al., 2009, Boake et al., 2007) the Fulg-Meyer Assessment was used (F.M.A.) This is a staircase of evaluation of the motor function, that evaluates and measure both clinical and research on the recovery of the hemiplegics patients post stroke.
In four studies (Liu et al., 2014, Burgar et al., 2011, Dromerick et al., 2009, Rabadi et al., 2008) the Functional Independence Measure was used (F.I.M.), which is a staircase of evaluation for the degree of disability.

In 3 studies (Morris et al., 2008, Chanubol et al., 2012 Dromerick et al., 2009) the Action Research Arm Test (A.R.A.T.), a test for the motor functions of the superior limb, was used. The National Institutes of Health Stroke Staircases (N.I.H.S.S), which evaluates neurological deficit following a stroke, was instead used in 2 studies (Sundseth et al., 2014, Da Silva Cameirao et al., 2011); the modified Rankin Scale (mRS), a fast staircase to compile, simple, a great deal diffused and useful in the studies of notable numerousness that evaluates disability following the stroke, was used in 2 studies (Sundseth et al., 2014, Da Silva Cameirao et al., 2011).

Barthel Index (B.I.) was adopted in 2 studies (Sundseth et al., 2012, Da Silva Cameirao et al., 2011, Galeoto et al., 2015). This represents the gold standard for studies of staircases of disability for the neurological illnesses, and evaluates functions of daily life in stroke; it is also applicable to other pathologies.

Wolf Motor Function Test (W.M.F.T.), a test for the motor functional results of the superior limb post stroke, was used in 2 studies (Thrane et al., 2015, Burgar et al., 2011). The Stroke Impact Staircases, a specific tool to measure the quality of the life of people with cerebral stroke, was used in two studies (Thrane et al., 2015, Dromerick et al., 2009).

Nine Hole Peg Test is an extremely simple test to appraise the functionality of the superior limb, and it was used in two studies (Thrane et al., 2015, Morris et al., 2008); the Likert Scale was used in a study (Liu et al., 2014), while the Extended Barthel Index (E.B.I.) was used by Chanubol et al. (2012) study.

Motricity Index, which evaluates the motor ability after the stroke, was used in a study (Da Silva Cameirao et al., 2011); Medical Research Council Grade was instead adopted in a study (Da Silva Cameirao et al., 2011). Chedoke Arm and Hand Activity Inventory is a validated upper-limb measure that uses up to 7-point quantitative staircases in order to assess functional recovery of an arm and hand after a stroke: the purpose of this measure is to evaluate the functional ability of the paretic arm and hand to perform tasks that have been identified as important by individuals following to stroke. (da http://www.cahai.ca/) It was used in a study (Da Silva Cameirao et al., 2011).

Motor Power is used in a study (Burgar et al., 2011); Ashworth scores, staircase of evaluation of the extremely diffused spasticity, has another degree of reliability and it is used in a study (Burgar et al., 2011); Box and Bloks test (B.B.T.) in one study (Chanubol et al., 2012) deals with a test for the evaluation of the manual dexterity in the taking with the hand in the results of any motor lesion, especially in the results of stroke; analysis of the performance, initial evaluation, through the observation of a performed activity and re-evaluation of the same one after the treatment with the purpose to underline possible improvements, used in a study (Liu et al., 2009); Motor Status Staircases used in a study (Rabadi et al., 2008);

Rivermead Motor Assessment upper limb staircases, currency disability after stroke, furnishes a precise vision of the functional abilities of the patient used in a study (Morris et al., 2008); the Grooved Pegboard Test, a test for the evaluation of the manual dexterity, consists on the principle of the 9 Hole Peg Test, but it is not indicated to measure complex movements (Boake et al., 2007); Motor Activity Log (MAL) for focal deficit of the superior limb as a results of cerebral pathologies, is a system of measurement that appraises as the patients with stroke use the superior limb was also used in a study (Boake et al., 2007).

The follow-up in four studies (Chanubol et al., 2012, Liu et al., 2014, Liu et al., 2009, Rabadi et al., 2008) was not available, while for five articles the follow-up was up to three months (Sundseth et al., 2012, 2014, Da Silva Cameirao et al., 2011, Dromerick et al., 2009, Boake et al., 2007). In the remaining three articles the follow-up for up to six months (Thrane et al., 2015, Da Silva Cameirao et al., 2011, Burgar et al., 2011).

Evaluation of the quality of the studies:

Articles were analysed following Jadad score

- Five articles with a Jadad score of three points (Thrane et al., 2015, Morris et al., 2008, Chanubol et al., 2012, Liu et al., 2014, Sundseth et al., 2012);
- Five articles have a score Jadad of two points (Da Silva Cameirao et al., 2011, Burgar et al., 2011, Liu et al., 2009, Rabadi et al., 2008, Boake et al., 2007);
- Two articles have a score Jadad of one point (Sundseth et al., 2014, Dromerick et al., 2009).

Discussions

Rehabilitation treatment, carried out through occupational therapy methods, aims to improve and implement any injured functions concerning daily life activities. The integration of the Occupational Therapist working with nurses' work could be a valuable support to the functional recovery and the improvement of specific aspects.

The systematic review carried out suggests that a more efficient treatment in comparison to all the others cannot be defined. This conclusion is related to the fact that the majority of the investigated studies have small samples with a low Jadad score; therefore, the collected results cannot be generalized.

In several studies, beside those ones reported in this search, the occupational therapist was cited, but he/she developed the treatment in the control group; as a consequence of that he/she did not reenter in the requisite of inclusion. This, nevertheless, shows that this health care professional has an important role in the multidisciplinary team for the rehabilitation of patients affected by a stroke in the acute phase.

Despite these considerations, the study shows that treatments of occupational therapy in patients with a stroke in acute phase are essential and useful in the improvement of daily life activities. Indeed, in the study of Liu, Karen et al (Liu et al., 2014) occupational therapy treatment had improved five activities of daily life, suitable from a motor point and cognitive perspective to their recovery phase.

The experimental treatment of Self Regulation also suggests/supports the idea, thanks to the use of videotape, its helpfulness to stimulate the auto-reflection on own performances after having developed the activities. Finally, the evaluated (FIM and FMA) outcomes also demonstrated statistically relevant data/improvement. Despite such positive results, the study have numerous limits: the lack of the follow-up and the treatment carried out only one week.

Sundseth. et al. (2012) performed two methodologically equal studies where the mobilization was compared within 24 hours from the admission and between the 24 and the 48 hours from the admission. In the study performed in 2014 (Sundseth et al., 2014) no meaningful differences emerged after the follow up. In a previously published study in the 2012 (Sundseth et al., 2012), the patient's mobilization performed within 24 hours from the refuge shown a tendency toward poor results with a greater rate of mortality and great dependence in comparison to the patient's mobilization performed between 24 and 48 hours. These latter showed an improvement of neurological function.

Chanubol et al compared the Perfetti's Cognitive Sensory Motor Training Therapy to a conventional occupational therapy treatment. Perfetti's method does not have statistically significant results with respect to a traditional/usual occupational therapy treatment.

Da Silva Cameirão et al compared Virtual Reality (Rehabilitation Gaming System) therapy with a usual occupational therapy treatment and other not specific interactive games; the experimental group had its best performance in comparison to the control group both in the speed of the paretic limb and the scores of the scale.

Burgar et al compared low and high dose of Robot-Assisted therapy of the superior limb with Mirror Image Movement Enabler with a standard treatment. The results in the primary outcomes are not statistically relevant. The experimental group reported its best results in the FIM and also the best muscular tone at the time of discharge. There is statistical significance ($P<.05$) among the dose of Robot Assistive therapy and Ashworth scores to 6 months; this datum could mean that an high dose of this therapy can have positive effects.

Dromerick et al, compared a high and low dose of Constraint-Induced Movement Therapy with a usual occupational therapy treatment. According to Dromerick, the CIMT is equally effective in comparison to the usual treatment of occupational therapy.

Liu, Karen et al supported the Motor Imagery improvement of the performance and the ability of the patients in the activities in which he/she has been trained and not, particularly as it regards new environments, where it has not developed the training. The experimental group has developed the treatment of the Motor Imagery while the control group the standard treatment.

There are several limitations in this study. Results can not be generalized to those patients having brain lesions and levels of cognitive and emotional functions different from those ones in this study. The relatively small sample size, use of behavioral test which is less sensitive, and lack of follow up assessment call for a caution interpretation of the findings.

Rabadi et al. affirmed that the treatments based on the activity of the superior (The Monark Arm Ergometer and Robot Aided therapy Mit-Manus) limb and the occupational therapy equally reduce in the disability and improving the motor functions of the superior limb.

Morris et al. developed a study and compared the Bilateral Training with Unilateral Training. As far as study results are concerned, there are not statistically significant results. Participants had various types of celebrate lesions with different degrees of severity of the motor deficits and this surely constituted an important aspect to take into account.

Boake et al carried out a study on the Constraint Induced Movement Therapy in comparison to the traditional treatment. Between the two treatments, there are not, for a long time meaningful differences concerning the improvements. The patients that have received the treatment of CIMT show an apparent advantageous tendency as it regards the measurements of the motor

functionality and an improvement in the quality of the performance in the ADL using the limb affection. Also this study introduces a small set of sample.

Also Thrane et al developed a study on CIMT in comparison to the standard treatment. The results pointed out that there were not meaningful differences, but the scores of the Wolf Motor Function test shown a best tendency in comparison of control group, this showed that the CIMT can lead to a consistent reduction of the hospital days admission in comparison to the standard treatment. The protocol of this study can be then used in safety in patients and it can increase the speed of the movement during the initial phase. Future searches should focus on the variability among various protocols and the optimal length of the therapy. Up to date the application of the CIMT in the initial phase of the rehabilitation of a stroke is not guaranteed because scientific evidences are limited as it regards the lasting effects.

In conclusion, the treatments more used are the CIMT and a very early mobilization. The majority of the study under analysis have too small samples.

Limits of the study

We found some limits:

1) Samples are limited for the generalization of results;
2) In four studies the follow-up has not been performed;
3) In general the JADAD score is low giving the probably limits its is rigor of methodology.

Conclusions

Due to the huge number of articles from which the study started and the difficulty in retrieving the corresponding evidences, the seek for a scientific evidence of this review was not trivial. Several articles do not clearly specify the health care professional who performs the treatment (i.e. in this case the occupational therapist).

The lack of follow up in four studies (Chanubol et al., 2012, Liu et al., 2014, Liu et al., 2009, Rabadi et al., 2008) unfortunately has not allowed a metadata analysis as data are incomplete.

A recommendation can be, however, deduced from this study that occupational therapists definitively need to perform and propose more clinical studies of higher quality and evidence level with the aim to build up a trustworthy arsenal of evidence-based interventions for persons affected by an acute stroke.

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