

EDITORIAL

Idiopathic facial palsy: umbrella review of systematic reviews and meta-analysesF. Agostini¹, M. Mangone¹, V. Santilli¹, M. Paoloni¹, A. Bernetti¹, R. Saggini² and T. Paolucci²

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Idiopathic facial palsy is the most common disease of the VII cranial nerve. There are many treatments to facilitate recovery from this condition: pharmacological, surgical, rehabilitative, but the effectiveness of some of these treatments, especially the latter, is still under discussion. The purpose of this umbrella review of systematic reviews is to analyse the literature in order to investigate the different rehabilitation interventions in patients suffering from idiopathic facial palsy. A scientific literature search was carried out from January 2009 until August 2019, using Mesh the terms “facial palsy”, “Bell’s Palsy”, “idiopathic facial nerve palsy”, combined with “rehabilitation” and “therapy”. Initially all the systematic reviews and meta-analyses of the last 10 years concerning rehabilitation treatments for the recovery of injured functions in facial palsy were included. Given the heterogeneity of the studies in the literature, which do not differentiate the different causes of facial palsy, all the causes of idiopathic facial palsy were included in the review. The research resulted in 94 published systematic reviews but only 6 were considered in respect to the inclusion criteria. All studies agree on the lack of high-quality scientific work to be able to say that Bell’s physiotherapy treatments for facial palsy are effective, in particular with regard to recovery times during the rehabilitation process. Future studies are needed, in order to highlight the therapeutic implications of the different rehabilitation methods, with standardized protocols, in patients suffering from facial palsy of different aetiology.

Idiopathic facial palsy is the most common disease of the VII cranial nerve (1). It is an inflammatory disease that affects the nerve, usually at the level of the stylomastoid foramen, for a variable segment of length. The aetiology is still unknown. The most accepted hypothesis remains the edema of the facial nerve, which is compressed causing ischemia and paresis, associated with an immunological or viral disorder (2). It is believed that infection with the Herpes Simplex virus is the most common cause, favoured by exposure to cold, hence the name “frigore”, but also other viruses seem to be implicated in the onset of the

disease (3). The onset of the disease is acute or evolves over days or hours, with retro-auricular pain. The deficit is peripheral and affects the upper and lower parts of the face equally, on one side only, often causing complete palsy. The affected side becomes relaxed and expressionless and the angle of the mouth is lowered. In severe cases, the eyelid rhyme is wide and the subject is unable to close his eye completely, going through complications such as irritation of the conjunctiva and drying of the cornea. During the squinting of the eyes there is an incomplete closure of the eyelid from the affected side and the automatic rotation of the eyeballs

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makes the sclera appear (Bell's sign). In kinetic tests, half of the face remains motionless (complete palsy) or moves conspicuously less than the other half (paresis). In showing the teeth, the commissure of lips is deformed towards the healthy side. Generally, the examination of sensitivity is normal, but sometimes the external auditory canal and a small area above the mastoid process can be painful on contact. The diagnosis of facial palsy is clinical. There are no specific diagnostic tests. Electromyography tests may be useful for prognosis. The prognosis is generally good, since almost 90% of cases spontaneously recover completely or very satisfactorily. The complications are characterized by a permanent deficit of mimic musculature, contractures, axonic confusion phenomena and synkinesis of the eyes and mouth (*crocodile tear syndrome*). There are many treatments to facilitate recovery from this condition: pharmacological (1), surgical (2), rehabilitative (3), but the effectiveness of some of these treatments is still under discussion. Drug therapy is mainly based on corticosteroids to reduce nerve edema, often associated with an antiviral, pain relievers, artificial tears, lubricating eye drops and ophthalmic cream, accompanied by bandages to protect the eye in case of incomplete closure. It is important to start therapy as early as possible in respect to the onset of palsy. In the case of permanent outcomes, botulinum toxin inoculations, blocking the release of acetylcholine at the neuromuscular junction to treat synkinesis and hyperkinesis (e.g. peri-ocular, peri-oral and cervical muscles) or, in worse cases, surgery can be used (4, 5). The usefulness of rehabilitation treatment is still controversial in the recovery of facial mimic functions and in the reduction of recovery times, as well as in the reduction of complications. The techniques commonly used today are manifold: proprioceptive neuro-muscular facilitation (6), mime therapy (7), facial neuromuscular re-education (8), biofeedback (9), electrostimulation (10) and exercises for facial expressiveness (11). To date, however, there are no studies that suggest which rehabilitation approach and rehabilitation protocols are unequivocally more effective than others. In addition to this, the evidence and recommendations present in the literature today are dated and have not always addressed all

possible therapeutic strategies, even in relation to the innovations that have been made over the years. In recent years, rehabilitation professionals have had to choose from many systematic reviews in the literature that address the same topic, with a high variability in quality and aims, that made it difficult to administer the possible treatments. Recently, systematic reviews of other systematic reviews, relating to the same topic, were conducted, allowing the results to be compared in order to provide the necessary evidence (12). These systematic reviews, identified in the literature as umbrella reviews or summary of systematic reviews, are intended to summarize the evidence of more than one systematic review, including the combination of different interventions, different outcomes, different conditions, populations, or effects adverse. A working group formed by the Joanna Briggs Institute of the University of Adelaide (Australia) developed the methodological indications for the realization of an umbrella review including both quantitative and qualitative evidence (12). Taking this into consideration, the purpose of this umbrella review is to analyse the literature in order to investigate the different rehabilitation interventions on patients suffering from idiopathic facial palsy.

MATERIALS AND METHODS

Search strategy

A scientific literature search (PubMed, Google Scholar, PEDro and Cochrane) was carried out from January 2009 until August 2019, using Mesh terms and free-text terms as: "facial palsy", "Bell's Palsy", "idiopathic facial nerve palsy", combined with "rehabilitation" or "therapy", and "systematic reviews" or "meta-analyses". The search results were then combined with "Proprioceptive Neuro-muscular Facilitation", "Mime Therapy", "Facial Neuromuscular Re-education", "Biofeedback", "Electrostimulation" and "Exercises".

Inclusion/exclusion criteria

Initially all the systematic reviews and meta-analyses of the last 10 years concerning rehabilitation treatments for the recovery of injured functions in facial palsy were included. Given the heterogeneity of the studies in the literature, which do not differentiate the different causes of facial palsy, all the

causes of idiopathic facial palsy were included in the review. All studies published more than 10 years ago, not in English, which did not mention rehabilitation treatments, and which treated other types of peripheral facial palsy were excluded.

PICO

The population included had to have a diagnosis of peripheral facial palsy of any severity, and be over 15 years of age. The intervention was to be rehabilitative, compared to other pharmacological and non-pharmacological interventions. All instrumental physical therapy treatments (electrotherapy, thermotherapy, hydrotherapy, phototherapy, ultrasound therapy), manual (Neuromuscular Proprioceptive Facilitations, stretching) and specific exercises (Neuromuscular Facial Retraining,

Mime Therapy, Mirror Therapy) and combinations of these were taken into consideration.

The primary outcome was to recover motor function, evaluated by scales, validated by the international scientific community [House-Brackmann Scale (13), Sunnybrook Facial Grading System (14), Facial Clinimetric Evaluation scale - FaCE (15)] or questionnaires [Facial Disability Index (16)]. The secondary outcome investigated the recovery time.

Data extraction

Three of the Authors conducted data extraction independently and the inconsistencies were overcome by the comparison of the data and the debate. The information obtained included: date of publication, research period, characteristics of the studies included and participants in

Table I. Characteristics of the included studies

Author	Type	Diagnosis	Topic	Results	Limits	AMSTAR
Teixeira et al.	Systematic review (12 RCT) and meta-analysis	- Bell's palsy - Idiopathic facial palsy	- Manual Therapy - Elettrstimol. - Exercise - Acupuncture	The study does not provide evidence regarding the benefits or risks of physiotherapy.	Lack of high-quality studies. Heterogeneity of interventions and controversial results. Conflict of interest not specified.	10/11
Fargher and Coulson	Systematic review (5 RCT) and meta-analysis	- Bell's palsy	Electrostimulation in the acute phase	No evidence in favor of electrostimulation.	No duplication of search and data extraction.	7/11
Ferreira et al.	Systematic review (2 RCTs)	- Idiopathic facial palsy	- Elettrstimolazione - Individual Exercise - Mime Therapy	Moderate efficacy in reducing paresis.	Reduced analysis sample. Unclear outcomes.	7/11
Holland et al.	Systematic review (13 mixed articles. 3 RCT on rehabilitation)	-Paralisi facciale periferica non specificata. - Bell's palsy	- Drugs - Hyperbaric Oxygen Therapy - Facial Re-Education (Mime Therapy and Exercise)	No evidence in favor of facial re-education.	Reduced and low-quality analysis sample. Extraction and analysis not performed by more than 1 researcher independently. Lack of inclusion criteria and detail on the search strategy.	5/11
Pereira et al.	Systematic review and meta-analysis (6 RCT)	- Bell's palsy 67% - Herpes Zoster: 13% Lyme disease: 1% Trauma: 1% Iatrogena: 1% Meningioma: 2% Facial neuronal apoptosis : 1%	Exercises	Increased facial mimic functions.	Inclusion criteria are unclear.	6/11
Baricich et al.	Systematic review (7 RCTs, 4 pilot studies, 1 preliminary study, 3 retrospective studies)	- Bell's palsy - Ramsay-Hunt Syndrome - Acoustic neuroma - No specified Peripheral facial paralysis	- Electrostimulation - Mime therapy - Biofeedback - PNF - Neuromuscular Re-Education	Mime therapy can improve functional outcomes.	Missing list of excluded studies.	8/11

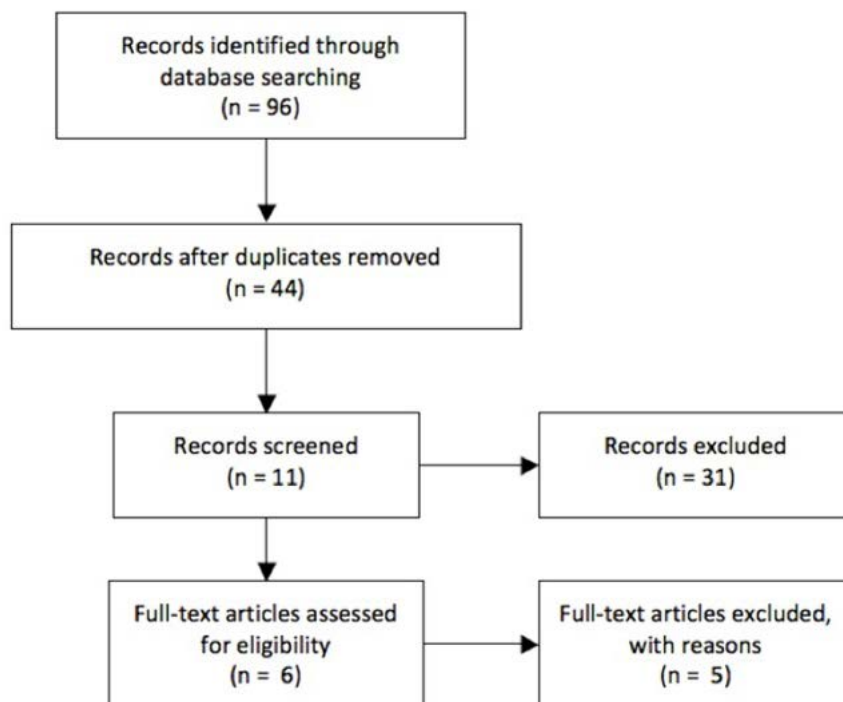


Fig. 1. Flow chart

the studies, interventions, objectives, results obtained and outcomes, and limitations.

Risk of bias assessment

All the systematic reviews and meta-analyses included in the study that met the inclusion criteria were assessed using the Assessment of Multiple Systematic Reviews (AMSTAR) as a quality assessment tool (17).

RESULTS

After the duplicates were removed, 44 articles were identified. Thirty-one articles were discarded after reading the abstracts because they did not meet the inclusion criteria. Eleven articles were selected for reading the full text. Five articles were discarded because they were narrative revisions. Six articles selected for the preparation of this umbrella review: 6 systematic reviews, including 3 meta-analyses (Flow chart – Fig. 1). The characteristics of the selected studies are summarized in Table I.

Teixeira et al. (2) published a Cochrane systematic review in 2012. Randomized controlled trials were selected that included rehabilitation interventions, with population of all ages and all severity of Bell's palsy. Twelve studies were selected: four studied the effect of electrostimulation; three of exercises; five combined or compared acupuncture physiotherapy treatments. GRADE was used in drafting the article. The primary outcome analysed was incomplete recovery six months after randomization. This study is of high quality (AMSTAR score of 10/11), but has some limitations due to the low quality of the trials analysed, the heterogeneity of the interventions, the controversy of the results and the lack of details regarding the method of data extraction used. They analysed the various rehabilitation interventions separately. Regarding electrostimulation, in three studies out of four, it did not bring any statistically significant improvement in the recovery of function, and in one study, the control group, which did not receive electrostimulation, obtained better results than

the group of study. Regarding the recovery time, two studies, of low quality and high risk of bias, obtained discordant results: one analysed the reduction of recovery times in the tympanic cord injuries, in the other, a large number of participants did not obtain results after three months. Only one study-analysed patients with chronic Bell's palsy diagnosed for at least 9 months. Limited by a small number of participants, the study reports an improvement in the House-Brackmann scale from grade V to grade III, but the authors of the review analysed how it was an improvement on the score but not necessarily a functional recovery. The facial exercises, analysed in three studies that used the Kabat method and conventional exercises, did not obtain statistically relevant results, however in one study, the recovery was faster in the group treated with the Kabat method for two weeks. In a subgroup analysis, participants with moderate palsy, treated with the Kabat method, shortened recovery time after 12 weeks compared to the control group treated with conventional exercises, while there was no difference in the subgroup with mild palsy. Facial exercises showed a better trend in chronic cases and in moderate/severe cases, but without a statistical significance. They conclude that there is no high-quality scientific evidence to support recovery or the risks of physiotherapy in Bell's palsy, but there are only low-quality articles in favour of the exercises, which suggest a reduction in recovery times and sequelae in acute cases. The effectiveness of patient-tailored exercises must be demonstrated with other randomised control trials (RCTs). There was no judgment regarding electrotherapy (2).

Fargher and Coulson (18), in a systematic review of 2017, analysed the effect of electrostimulation in the treatment of Bell's palsy. Five studies were included: four during recovery (acute phase); one in the chronic phase of facial palsy. The outcomes were: (i) the time required for complete recovery; (ii) the percentage of complete recovery out of the total study population; (iii) the improvement of facial functions; (iv) the percentage of complications that arose. This study is of medium quality (AMSTAR 7/11). The limits are the lack of an analysis of the risk of publication bias and the work carried out by the two authors not independently.

They clearly report that electrostimulation did not effective in improving and/or shortening the recovery of facial functions in acute cases. The studies included in the review used different protocols for electrostimulation: three studies used similar electrostimulated muscle contractions, but with different application frequency, from one to five times a week. Another study used continuous stimulation below the contraction threshold, placing the electrodes on the main branch of the facial nerve and not on the muscle bellies. Regarding recovery time, a single study divided the sample into two subgroups, with and without nerve degeneration, assessed by electromyography. In the subgroup without degeneration, there is no difference in recovery time. In the degenerative subgroup, the first movements appeared after fifty-three days, compared to the sixty-six of the control group, but the addition of (laser) radiation, as part of the intervention protocol, confuses the results. In the other studies, there is no significant difference in recovery times. The only study analysed on chronic facial palsy reports limited beneficial effects in the massive use of electrostimulation, but of low scientific quality. None of the studies included in the review report adverse effects such as reinforcement of synkinesias, but one study citing the potential risk of establishing this complication is cited (18).

Ferreira et al. (19), in their systematic review published in 2011, study the effectiveness of physiotherapy in recovering from idiopathic facial palsy. Only 2 RCTs were included in the review, which include facial neuromuscular re-education treatments, electrostimulation and Mime Therapy. The evaluation of the studies was carried out following the PEDro scale. This study (AMSTAR 7/11) is limited by the reduced number of RCTs analysed and by the non-explanation of the risks of publication bias. Authors affirm that the studies analysed demonstrate moderate efficacy in the treatment of facial neuromuscular re-education in association with the use of a mirror, in the acute and chronic phases respectively, but studies of better quality and greater sample size are needed to support their conclusions. Mime Therapy has also been shown to be effective in reducing facial asymmetry in patients suffering from chronic idiopathic facial palsy,

after three months of treatment, assessed with the Sunnybrook Facial Grading scale, and a reduction of 0.6 points on the House-Brackmann scale (19).

Holland and Bernstein (20) worked on a systematic review published in 2014. Their study investigated the effects of drug therapy and physiotherapy treatment for Bell's palsy in adults and adolescents. Three RCTs and two systematic reviews eligible for analysis were identified and were assessed through the GRADE. The outcomes were: (i) recovery of motor function; (ii) the presence of sequelae at 12 months; (iii) the recovery time; (iv) the presence of adverse effects. The treatments carried out were facial re-education exercises and Mime Therapy. This is not a high-quality study (AMSTAR 5/11), because of a lack of explanation of the inclusion criteria and a reduced sample of analysis. They analysed the effectiveness of facial rehabilitation treatments, such as Mime Therapy or facial exercises, compared to subjects on the waiting list for treatment, in patients suffering from unspecified chronic peripheral facial palsy and chronic Bell's palsy for at least nine months. The analysis of low-quality studies suggests that facial re-education may be more effective than receiving any treatment regarding the improvement of facial functions in three months but may not be effective in reducing the risk of incomplete recovery. Compared to conventional therapy, facial re-education treatments can shorten the time for starting and completing recovery, with a low level of evidence. In their article they report that it was not possible to recognize the effectiveness of physiotherapy in the treatment of Bell's palsy and idiopathic facial palsy, but they add in the comments that there is limited evidence in support of facial re-education for the improvement of facial functions and quality of life. The multidisciplinary environment allows optimal outcomes to be achieved thanks to the coordination between healthcare professionals in medicine, surgery, physiotherapy and psychotherapy (20).

Pereira et al. (21) carried out a systematic review with meta-analysis on facial exercise therapy for facial palsy, published in 2011. Of 132 studies found, only six met the inclusion criteria, and only one allowed meta-data analysis. The outcomes measures considered were: (i) facial symmetry; (ii) synkinesias; (iii) muscle rigidity;

(iv) labial mobility; (v) physical and psychological aspects related to palsy. The treatments included re-education exercises combined with a mirror, neuromuscular rehabilitation exercises (Kabat), Mime Therapy, 30 minutes of autonomous exercises. With unclear inclusion criteria and a lack of risk assessment for publication bias, this study has an AMSTAR score of 6/11. They performed a meta-analysis, including a single study, on the effectiveness of Mime Therapy in the rehabilitation of facial palsy. The study participants were all patients with peripheral facial palsy for at least 9 months, who carried out rehabilitation treatments with Mime Therapy (one/week; 45 minutes per session) associated with exercises to be carried out independently, for a period of 3 months. The experimental group obtained better results than the control group, which did not carry out any type of treatment. The times and methods of application of the treatments were extremely heterogeneous: from once a month to five times a week, for a period ranging from two weeks up to diverse months. All treatments proved effective for the improvement of mimic functions, with a peak of improvement in the groups treated with Mime Therapy in cases of facial palsy for more than 9 months. The different methods of evaluation and description of the outcomes were the main limitations of this study, associated with the low number and low quality of the studies analysed. A single study reported no beneficial effects regarding synkinesias. The use of biofeedback with mirror and electromyography used in a single study of this review demonstrated a beneficial effect in the recovery of functions. The meta-analysis performed on the single study indicates that Mime Therapy is the most effective treatment for improving the outcomes of functionality, but only in patients suffering from chronic peripheral facial palsy (21).

Baricich et al. (22) published a systematic review in 2012 evaluating the effectiveness of rehabilitation treatments for peripheral facial palsy. The research was performed including all RCTs, control cases, cohort studies and case series over a period between 1990 and 2010. Fifteen studies were selected, assessed through the American Academy Evidence Classification of Neurology. The treatments carried out in the included articles were: (i) electrostimulation; (ii)

Mime Therapy; (iii) biofeedback; (iv) proprioceptive neuromuscular facilitation; (v) neuromuscular re-education. The review (AMSTAR 8/11), turns out to be a high-quality study. They analysed the various treatments used in the RCTs included in their review. Regarding electrostimulation, they did not obtain significant results. Two studies obtained favourable results in the treatment of chronic palsy, using two types of current: one below the muscle contraction threshold and another below the perceptible threshold. The results are favourable, but intensive treatment (6 hours/day, every day for 6 months) requires high patient compliance. Mime therapy has proved effective in the treatment of chronic peripheral facial palsy, maintaining the results obtained even one year after the treatment. The studies analysed, which included mirror biofeedback and electromyography,

reported functional improvements without statistical significance, and in five out of six studies the groups were formed by facial palsy that arose at least five months earlier. One study included subjects with Bell's palsy that had occurred in the past month, who performed exercises associated with biofeedback with electromyography (EMG), achieving better results than the control group. Two studies investigated the effectiveness of the Kabat method performed in acute cases. The authors conclude by asserting that there is no unequivocal scientific evidence in favour of rehabilitation, but some benefits were recognized, in particular with Mime Therapy (level of effectiveness C), easy availability and low cost for patients (22).

The results obtained from the included articles are summarized in Table II. Table III represents a summary of the articles considered by the included studies.

Table II. Results obtained from the included articles

Author	Conclusion	Function improvement
Teixeira et al.	There is no high-quality scientific evidence to support benefits or risks in physiotherapy treatments for idiopathic facial paralysis. Low quality evidence exists in favor of tailor-made facial exercises to improve function, especially in cases of moderate and chronic severity. Low quality evidence that facial exercises reduce complications in the acute phase.	Electrostimulation vs control: in favor of control. Electrostimulation vs prednisone: favor electrostimulation Exercises towards waiting list: favor exercises Exercises vs conventional therapy: favor exercises
Fargher and Coulson	There is no scientific evidence to support electrostimulation during recovery from the acute phase of Bell's palsy. There is a low level of evidence in patients with chronic symptoms.	Electrostimulation HB: average difference: -0.38; 95% CI [-0.78,0.03]
Ferreira et al .	Based on moderate scientific evidence, facial neuromuscular reeducation can reduce asymmetric movements in the acute and chronic stages. 2 of the included studies reported adverse effects (clinical worsening, synkinesias) of electrostimulation.	Electrostimulation SB: experimental group 11 points more than control Mime Therapy: SB: +20.4 compared to the control HB: +0.6 compared to the control
Holland et al.	There is little evidence that facial re-education, such as Mime Therapy, can increase both the functionality and the quality of life of people with persistent facial paralysis.	Mime Therapy. FDI Score, 3 months later. From 56.8 to 73.5 = 16.7; p <0.02 FDI Social Score: 68.6 to 80.7 = 12.1 p <0.01 Exercises vs waiting list. SB; average difference 20.40; 95% CI [8.76, 32.04]. FDI: average difference 14.50, 95% CI [4.85, 24.15]
Pereira et al.	This systematic review suggests that Mime Therapy is effective for the outcome of functionality in facial paralysis.	Mime Therapy. FDI: standard average difference = 13.90; IC [4.31, 23.49]; p = 0.005
Baricich et al.	Level C of evidence regarding the effectiveness of physiotherapy in peripheral facial paralysis. Mime Therapy can be effective for improving functional outcomes.	PNF: improvement on the non-quantified HB scale (15 days from the onset of symptoms) Neuromuscular reeducation: 1 point improvement on the HB scale. Mime therapy: unspecified improvement of HB and SB after 12 months of treatment.

HB: House-Brackmann Grading System; SB: Sunnybrook Grading Scale; FDI: Facial Disability Index; PNF: Facilitazioni Neuromuscolari Proprioceptive

Table III. Summary of the articles considered by the included studies

Study	Type of study	Teixeira et al, 2011	Fargher and Coulson, 2017	Ferreira et al, 2011	Holland and Bernstein, 2014	Pereira et al, 2011	Baricich et al, 2012
Alakram and Puckree, 2010	Preliminary study	X	X				X
Barbara et al, 2010	RCT	X				X	X
Barbara et al, 2003	Retrospective study						X
Beurskens, 2007	RCT	X					
Beurskens et al, 2006	RCT				X		
Beurskens and Heymans, 2003	RCT			X	X	X	X
Beurskens and Heymans, 2006	RCT						X
Cardoso et al, 2008	Systematic Review				X		
Dalla Toffola et al, 2005	Retrospective cases series review						X
de Almeida et al, 2009	Systematic Review				X		
Engström et al, 2008	RCT				X		
Farragher et al, 1987	RCT		X				
Flores et al, 1998	RCT	X					
Hyvärinen et al, 2008	Pilot case series						X
Kim et al, 2016	RCT		X				
Lee et al, 2013	RCT				X		
Lindsay et al, 2010	Retrospective cases series review						X
Lockhart et al, 2013	Systematic Review				X		
Manca et al, 1997	Pilot case series						X
Manikandan, 2007	RCT	X		X			X
Mosforth and Taverner, 1958	RCT	X	X				
Nakamura et al, 2003	RCT					X	X
Pan, 2004	RCT	X					
Qu, 2005	RCT	X					
Quant et al, 2009	Systematic Review				X		
Racic et al, 1997	RCT				X		
Ross et al, 1991	RCT					X	X
Salinas et al, 2013	Systematic Review				X	X	
Segal et al, 1995 (A)	RCT						X
Segal et al, 1995 (B)	Pilot case series						X
Sullivan et al, 2007	RCT				X		
Targan et al, 2000	Pilot case series						X
Teixeira et al, 2011	Systematic Review				X		
Wen and Zhang, 2004	RCT	X					
Wong et al, 2004	RCT	X					
Yang, 2001	RCT	X					
Zhang, 2005	RCT	X					

DISCUSSION

The scientific literature contains multiple studies, with a great variability of quality and objectives, relating to rehabilitation interventions concerning the most suitable treatment to be administered in this kind of patient. All studies agree on the lack of high-quality scientific work to be able to say that Bell's physiotherapy treatments for facial palsy are effective, in particular regarding recovery times during the rehabilitation process. Various methods have been analysed, but none has yet given appreciable results in order to make recommendations with strong scientific evidence in favour, while, on the other hand, it is possible to make recommendations that are not in favour.

Mime Therapy appears to be the most suitable rehabilitation treatment in chronic facial paralysis. Although there is still no high-quality scientific evidence to objectively verify its effectiveness, many studies agree that better results are obtained with this type of treatment, both regarding the improvement of mimic functions and for the reduction of recovery time. Mime Therapy includes self-massage, relaxation exercises, breathing exercises coordinated with facial movements, pronunciation of letters and words. The relatively short duration of this treatment (10 sessions in 4 weeks) supported by exercises to be carried out daily for 45 minutes independently, makes it a useful tool that is easy to access and apply by patients and therapists. In order to test this hypothesis, high-quality studies are needed.

Electrotherapy appears to be effective only in chronic patients, but with a low level of scientific evidence and requires extremely prolonged treatments (6 hours a day for 10 months). The effectiveness of electrostimulation, although easy to apply and available to patients, remains uncertain. The guidelines published by De Almeyda et al. (11) take sides against the use of electrotherapy in the acute phase of the disease, attributing a high risk of establishing synkinesias and muscle stiffness. The review by Fargher and Coulson (18) does not reveal any risk associated with electrostimulation taking into consideration the studies analyzed, but they also cite a previous study regarding the potential risk of

negative outcomes. In the work of Teixeira et al. (2), non-reassuring data are extrapolated regarding the use of this type of therapy; the authors refrain from giving their opinion on the matter by virtue of the conflicting results regarding recovery times, the results that show a greater improvement in the control group compared to the treatment group, the low quality of the studies carried out and the high risk of bias. At the same time, in patients with chronic facial weakness, electrostimulation seem to be effective in maintaining good muscle tone and trophism and in decreasing the risk of complications. The extreme heterogeneity of the rehabilitation protocols used during the development of the RCTs remains a fundamental problem to standardize and protocol the rehabilitation treatment. Electrostimulation applied for 30 minutes a day or for 6 continuous hours, different types of current used, exercises carried out independently at home or only with the presence of therapists, application times and duration of treatments extremely variable from study to study, makes it impossible to establish a unique protocol that can be used as a reference for rehabilitators.

The use of biofeedback as a support for rehabilitation seems to be an important factor in improving functions and reducing recovery times. Mirror therapy and EMG have proved extremely useful as accessory tools, helping the patient to perform coordinated movements and to separate movements. The multidisciplinary setting remains the ideal place to intervene on patients, allowing easy access to the EMG and the management of sequelae associated with the pathology.

In acute injuries, physiotherapy does not seem to play a fundamental role in recovery, with low scientific evidence in favour of rehabilitation with the Kabat method, applied as early as possible every day until the fifteenth day of illness. Given the lack of adequate scientific literature to formulate a standardized protocol, it cannot be assessed how much physiotherapy intervenes in the recovery of facial nerve palsies. The multidisciplinary management of the patient by professionals of medicine, surgery, nursing, physiotherapy and psychotherapy allows the improvement of the functional outcome and the quality of life of the patients.

Another important aspect not to be underestimated is the containment of synkinesias, an outcome that was not included in the writing of this article, but on which it is important to spend a few words. From the analysis of the literature, the rehabilitation strategies available to professionals in the sector seem not to be effective in reducing synkinesias. In literature there are few works of low quality, which show a poor efficacy of physiotherapy treatments on this complication .

Implication for future research and clinical practice

Today, it is extremely important to provide clear evidence and high-level recommendations, due to their clinical relevance. From the analysis of the literature, it is evident how difficult it is to compare different rehabilitative interventions (physiotherapy or instrumental physical therapy), which use different therapeutic protocols on patients with facial palsy, but with different aetiology and follow-ups. Future studies are needed, in order to highlight the therapeutic implications of the different rehabilitation methods, with standardized protocols, in patients suffering from facial palsy of different aetiology.

CONCLUSION

Although this is the first umbrella review on this topic, there are some limits to the study. The results are too heterogeneous to establish an effective rehabilitation protocol. The articles, analysed by the various systematic reviews included in this review, use extremely variable protocols for time of application and duration of treatments. Experimental work mostly of not very high-quality limits the possibility of drawing objective conclusions.

In most of the studies analysed, the causes of peripheral facial palsy are mixed. For this reason, a clear correlation between the causes, the time of onset of the disease and the effectiveness of the rehabilitation treatment cannot be declared.

Even if the individual authors, in the reviews analysed in respect to the use of electrostimulation, do not express a clear opinion, surely this rehabilitative approach must be further investigated. Certainly, Mime therapy should be preferred in the rehabilitation of patients with peripheral idiopathic paresis of the

facial nerve. The physiatrist must have a clear clinical picture and apply the most suitable strategies for each patient, to obtain an estimate of the degree and recovery time of the injured functions. Further studies are needed in order to better quantify the effectiveness of the various rehabilitation interventions in patients with idiopathic facial palsy.

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