REPORT

Literature Review of Evidence Based Physiotherapy in Patients with Facial Nerve Paresis

Carien HG BEURSKENS1, Ingrid AL BURGERS-BOTS2, Dineke W KROON2 and Rob AB OOSTENDORP3

1Department of Physiotherapy, University Medical Centre, Nijmegen, The Netherlands
2Department of Physiotherapy “Vrije Universiteit” Medical Centre, Amsterdam, The Netherlands
3Allied Health Care, University Medical Centre, Nijmegen, Centre for Quality of Care Research, Nijmegen, and Dutch National Institute of Allied Health Professions, Amersfoort, The Netherlands

Abstract. A variety of physiotherapeutic approaches have been tried out during the past 25 years to alleviate the plight of patients with peripheral facial nerve paresis. The objective of this review was to assess the effectiveness of physiotherapy in patients with facial nerve paresis. Trials were identified by computerised searches of biomedical databases, reference lists, and by contacting investigators. Selection criteria were randomised controlled trials of physiotherapy for the improvement of sequelae of facial nerve paresis, comparing the treatment with either another intervention or no intervention. Two reviewers independently assessed the trials using the PEDro scale. Two physiotherapy randomised controlled studies were identified. Interventions used for treatment of patients with facial nerve paresis in the included studies were relaxation, biofeedback and exercise therapy. Neither of the two randomised controlled studies showed scientific evidence of a physiotherapeutic approach in comparison with a control group. Both studies described benefits of the interventions. Further randomised controlled studies are required to determine the effectiveness of physiotherapy in patients with facial nerve paresis.

Key words: facial nerve paralysis, facial nerve paresis, review, physiotherapy

(J Jpn Phys Ther Assoc 7: 35–39, 2004)

About half of the incidence of peripheral facial nerve paralysis in western countries is as a consequence of Bell’s palsy; 20:100.000 adults per year1-3). This implies that there are 40:100.000 new cases of peripheral facial nerve paralysis per year of which approximately 30% will develop a facial nerve paresis with sequelae (asymmetry of the face at rest and during movement, problems with speaking, eating and drinking and psychosocial problems) varying from very mild to very severe4). According to an a-selective survey (unpublished internal report) among 400 Dutch physiotherapists (response rate 76 %) in 1996, 25% of them were involved in the treatment of patients with facial nerve paresis.

An earlier review of the international literature from 1956 to mid-1991 of physiotherapy for patients with facial nerve paresis was made in 19925). This revealed a variety of physiotherapy modalities being practised, mainly: exercise therapy, massage, electrotherapy, biofeedback, ultrasound, short-wave diathermy, infrared and hot packs. Of the 17 published articles in this review aiming to study the effectiveness of physiotherapy in facial nerve paresis, 14 were based on a pre-experimental design, two on a quasi-experimental design and only one was a randomised controlled study (RCT). This RCT from Mosforth & Taverner6) did not show differential outcomes for two modalities of physiotherapy (electrotherapy + infrared versus massage therapy). The other studies are, when considered according to present standards, too weak concerning their design to substantiate the claimed benefits. The present medical scientific community demands RCTs as a golden standard7) and therefore only these are considered, the objective being to document the further development of evidence based physiotherapy in patients with peripheral facial nerve paresis up to the end of 2002.
**Material and Method**

*Criteria for considering studies for this review*

Studies included in this review were selected according to the following set of criteria: a) the design being a RCT; b) all patients involved had a peripheral facial nerve paresis; c) all interventions in which any modality of physiotherapy (a combination of modalities was possible) was employed were considered, also studies comparing physiotherapy with non-physiotherapeutic treatment were considered for this study; studies containing interventions such as (electro)acupuncture or chiropractic methods were not included because we do not consider these as a modality of physiotherapy; d) the studies were published in peer-reviewed journals between 1991– end 2002.

*Search strategy for identification of studies*

A search was performed using computerized bibliographic databases [Medline, Chinal, Excerpta Medica (part Rehabilitation & Physical Medicine), PEDro, Current Contents and the Cochrane Library] in the period from 1991 – end 2002 to identify RCTs. This was combined with the medical subject heading ‘facial paralysis’ and other key words pertaining to facial nerve disorders and physiotherapy (e.g. Bell’s palsy, facial paresis, asymmetry, synkinesis, physical therapy, rehabilitation, biofeedback). No language restriction was made.

Thirty-two articles were found. References of identified articles, relevant conference proceedings and textbooks were checked by the first author (CB). Any additional study that seemed eligible was retrieved and assessed according to title, abstract and keywords. The last search for RCTs was performed on December 31st 2002.

*Methodological quality assessment of the studies*

Trials included in this review were rated using a checklist called the PEDro scale (Table 1). The PEDro scale is based on the Delphi list, a validated quality assessment tool. This scale considers the following aspects of trial quality: a) the internal validity of the trial and b) whether or not the trial contains sufficient statistical information to be interpretable.

In total the PEDro scale contains 11 items, of which 10 items assess internal validity. In judging the studies we omitted criterion one (eligibility criteria) because it refers to the generalisation of the results. The maximum score by using the PEDro scale is therefore 10. Two reviewers (CB, IB), independently assessed each of the eligible studies. In case of disagreement a consensus method was used and a third reviewer (RO) was consulted to resolve this disagreement. For each study a total score ranging between 0 and 10 was calculated by summing the dichotomised scores of 2–11 of the PEDro scale.

**Results**

Two RCTs involving patients with peripheral facial nerve paresis and physiotherapy were identified (A: Ross et al. [11], B: Segal et al. [12]). See Table 2 for characteristics of these studies.

**Table 1.** The PEDro scale (last modified March, 1999).

<table>
<thead>
<tr>
<th></th>
<th>no / yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Eligibility criteria were specified</td>
</tr>
<tr>
<td>2.</td>
<td>Subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received).</td>
</tr>
<tr>
<td>3.</td>
<td>Allocation was concealed.</td>
</tr>
<tr>
<td>4.</td>
<td>The groups were similar at baseline regarding the most important prognostic indicators.</td>
</tr>
<tr>
<td>5.</td>
<td>There was blinding of all subjects.</td>
</tr>
<tr>
<td>6.</td>
<td>There was blinding of all therapists who administered the therapy.</td>
</tr>
<tr>
<td>7.</td>
<td>There was blinding of all assessors who measured at least one key outcome.</td>
</tr>
<tr>
<td>8.</td>
<td>Measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups.</td>
</tr>
<tr>
<td>9.</td>
<td>All subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analysed by “intention to treat”</td>
</tr>
<tr>
<td>10.</td>
<td>The results of between-group statistical comparisons are reported for at least one key outcome.</td>
</tr>
<tr>
<td>11.</td>
<td>The study provides both point measures and measures of variability for at least one key outcome.</td>
</tr>
</tbody>
</table>

Legend: *No indicates 0 point, yes 1 point for the numbers 2–11.
Results of the design and the methodological quality of the studies

The overall methodological quality of the studies, assessed by using the PEDro scale, is shown in Table 3. The third reviewer was consulted three times to solve disagreement concerning items 2, 9 and 10.

The two studies were classified as a randomised controlled trial, however the report of Ross showed that randomisation was only used to assign patients to the two experimental groups, the control group was not formed out of the previous random assignment process. The control group is apparently a non-equivalent group and therefore comparison of any of the experimental groups with the non-equivalent control group is liable to a variety of internal validity threats.

The concealment of the randomisation was not mentioned in the studies. In study A the experimental groups and the control group were comparable for age, besides this the two experimental groups were also comparable for duration and severity of the paresis. In study B the patients in the experimental and control group were comparable for age, sex, duration of the paresis and severity of the paresis. Patients and therapists were not blinded in the studies, assessors were blinded in both studies. Study A lost one patient in the control group by attrition; in study B there was no loss to follow-up. Neither of the two studies mentioned an intention to treat analysis, however all patients (ten) were analysed in study B.

Results of physiotherapy as shown by the outcome ‘asymmetry of the face’ were mentioned in both studies. The studies reported means and standard deviations, and A also the standard error of the results. Besides these measures, outcomes in both studies were provided graphically.

Characteristics of the participants

All patients in the studies had a peripheral facial nerve paresis; in study A the causes were postoperative (mainly acoustic neuroma), Bell’s palsy and herpes zoster and in B all patients except one, had a Bell’s palsy. The duration of the paresis ranged in A from 18 months to 10 years (mean 46 months) and in B from 0.5 to 27 years (no mean score mentioned). The severity of the paresis was not specified in study B, in study A it ranged from House Facial Nerve
concerning linear measures of facial movement and visual improvements between pre- and post-test were noted seem to be beneficial for patients. Significant Effects of the interventions of four weeks.

patients received treatments three times a week for duration movement limited to half of this maximal movement. All therefore we can not accept their conclusions. Study B was not formed from the random assignment procedure; group was not equivalent to the experimental groups, as it assessment of voluntary movement. However, the control treatment duration of one year.

Study B compared a “small-movement” therapy with standard therapy. The standard therapy comprised patient education, relaxation, face tapping, biofeedback and “specific actions” (e.g. smiling). The “small-movement” group received the standard therapy with the difference that subjects had to cease exercises when synkinesis occurred, a single maximal movement was then made, the subsequent movement limited to half of this maximal movement. All patients received treatments three times a week for duration of four weeks.

Effects of the interventions

Neither of the two studies showed a significant effect of the interventions. Results of the intervention in study A seem to be beneficial for patients. Significant improvements between pre- and post-test were noted concerning linear measures of facial movement and visual assessment of voluntary movement. However, the control group was not equivalent to the experimental groups, as it was not formed from the random assignment procedure; therefore we can not accept their conclusions. Study B showed no significant reduction in synkinesis when the experimental group was compared with the control group.

Discussion

Only two randomised controlled trials were identified over the time period 1991–2002, these trials (Ross et al. 11) and Segal et al. 12) showing diversity in many aspects: heterogeneous patient groups, interventions and outcome measures. The quality of the studies was reasonable/good. Despite the fact that many patients with peripheral facial nerve paresis are referred for physiotherapy, little is known about the evidence of the various modalities of physiotherapy. Reasons for the small number of RCTs could be that the percentage of physiotherapists treating patients with facial nerve paresis is small, or that specialists are not well informed about the treatment possibilities of physiotherapy. Another reason could be that it is difficult to generate groups with sufficient numbers of homogenous patients (patients are referred one by one). The high requirements of RCT guidelines such as described in the CONSORT statement (Consolidated Standards of Reporting Trials 13) may discourage physiotherapists from performing a RCT.

With two RCTs we were unable to perform a meta-analysis. Applying the PEDro scale also gave considerations/objections, a disadvantage of the scale being the extended blinding. In physiotherapeutic research it is often not possible to blind both patients and therapists for a specific intervention, giving a substantially lower score on the PEDro scale.

A further disadvantage is that the number of patients is not categorised in the PEDro scale. The number of participants ranged from 10 to 31; neither of the two studies used a power calculation to detect the number of patients needed in the trial. An incorrect number of patients can influence the results in an adverse manner.

Bell’s palsy was the cause in most cases and duration of the paresis varied from 0.5 to 27 years. It is generally believed that spontaneous recovery of the facial nerve occurs in the first weeks and can continue until approximately nine months. It has to be taken into account that if patients are treated within this period of time, positive results could contribute to this spontaneous recovery and not the applied therapy.

The intervention differed in both studies, both of which applied biofeedback and used a variety of exercises. Combining several modalities of physiotherapy further complicates the discovery of which intervention is effective.

The main outcome measure was asymmetry of the face (at rest, during facial movement, synkinesis) measured in differing ways: linear measurement of facial movement, blinded visual assessments and electroneurography. Neither of the two studies examined disabilities such as eating, drinking and speaking or quality of life. Not known in the studies is whether these disabilities decreased or whether patients had an improved well-being due to therapy.

For the future it is important that well-designed randomised controlled trials are conducted in order to validate physiotherapy for patients with facial nerve paresis.

References

3) Devriese PP, Schumacher T, Scheide A, Jongh RH de,


