

EFFECT OF KINESIO TAPING IN HEMIPLEGIC PATIENT WITH SPASTICITY

BACHELOR THESIS

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Abstract

Stroke is a cerebral-vascular accident that the World Health Organization (OMS) defines: *“a sudden onset of signs and/or symptoms related to focal and/or global deficits of cerebral function, lasting more than 24 hours or resulting in fatal outcome, not attributable to another cause if not cerebral-vascular disease.”*

Cerebral-vascular disease is the second leading cause of death worldwide and the third leading cause of death in developed countries, after heart disease and cancer.

This is a pilot study based upon the evaluation, of two different therapeutic method, in patients affected by spasticity in the upper arm, due by a ischemic stroke.

Patients are divided into two groups, A and B, with random assignment.

Group A is composed of ten patients; these are involved in the application of Kinesio Taping in the upper spastic limb. The application is based on the EDF techniques (Epidermis, Dermis and Fascia).

Group B is composed of ten patient; these are subject to passive mobilization of the upper limb.

The evaluation concerned the measures of Range of Motion (ROM) for the joints of elbow, wrist and metacarpal phalangeal. All the joint are evaluated in two different ways: in position of rest, and in position of maximum elongation.

Five evaluation are made for the Range of Motion: T0, T1, T2, T3 and T4.

T0: is the first evaluation of patient

T1: is the second evaluation, it is made on the day after T0

T2: is the third evaluation, it is made on the day after T1

T3: is the fourth evaluation, it is made on the day after T2

T4: is the fifth evaluation, it is made on the day after T3.

After T0, all the patients are subjected to the treatment: Group A, to the application of Kinesio Taping; and Group B to the passive mobilization.

The aim of this study is to identify which kind of treatment is recommended for patients affected by stroke, for reduce spasticity.

Discussions of Results

In this thesis we investigated the effect of Kinesio Taping in the treatment of spasticity for patients affected by stroke.

The statistical analysis of data showed that the patients within the study group have a better performance than the control group, especially during the evaluation of T0-T2. More specifically, the study group achieved more statistically significant results in comparison to the control group.

The study group obtained significant results for T0-T2 in the following cases: the elbow evaluation during passive extension, the wrist at rest and the metacarpal phalangeal at rest.

Although not all values are statistically significant, the values of the study group are lower than those of the control group and are nearer to the significant value of 0.05.

The statistical analysis of the t-student of the difference of Group A and B shows that: the p-value for T0-T1 haven't a statistically significant (for the evaluation of elbow at rest, wrist and metacarpal phalangeal at rest and during passive mobilization), this means that the average differences between T0 and T1 that we observe in the two groups are not significantly different.

While the p-value for T0-T2, T0-T3 and T0-T4 for all the other circumstances has lesser than 0,05, this means that the average differences between are significantly different. This shows that the Kinesio Taping for T0-T2, T0-T3 and T0-T4 has greater efficacy.

I think that for T0-T1 the values are not significant because both the treatments are effective because T1 is the evaluation immediately after the mobilization and there is effectiveness. While for the other circumstances the Kinesio Taping has more effectiveness, because the effectiveness of mobilization occurred on the first day is lost, while that of Kinesio Taping persist.

It is possible to check this data in the charts: 22-25, 38-41, 54-57, 70-73, 86-789, 102-105.

For more in detail, many graphs were analyzed.

As shown in Graphic 15, during the evaluation of elbow at rest, it's possible to notice that, in Group A after the treatment with Kinesio Taping, the ROM T1 has improved of 11,3 degrees; the ROM T2 has improved of 12,8 degrees; the ROM T3 has improved of 8,6 degrees and the ROM T4 has improved of 6,4 degrees.

In Group B after treatment with passive mobilization, the ROM T1 has improved of 10,7 degrees; the ROM T2 has improved of 7,7 degrees; the ROM T3 has improved of 5 degrees and the ROM T4 has improved of 1,4 degrees.

In conclusion, it is clear that the best result it is with the application of Kinesio Taping, especially during T2. In Group B the lower value is during T1, but after that, the value begin to increase, and during T4 it is really close to T0.

Thus, Group A obtained the best result.

As shown in Graphic 21, during the evaluation of elbow during the passive extension, it's possible to notice that in Group A after treatment with Kinesio Taping, the ROM T1 has improved of 20,4 degrees; the ROM T2 has improved of 24,5 degrees; the ROM T3 has improved of 17,2 degrees and the ROM T4 has improved of 12,4 degrees.

In Group B after treatment with passive mobilization, the ROM T1 has improved of 15,5 degrees; the ROM T2 has improved of 8,5 degrees; the ROM T3 has improved of 5 degrees and the ROM T4 has improved of 2 degrees.

Therefore the best result it is with the application of Kinesio Taping, especially during T2, where the value is lower than all the circumstances.

In Group B the lower value is during T1, but after that, the value begins to increase, and during T4 there is only an improvement of 2 degrees, while in Group A there is an improvement of 12,4 degrees.

As shown in Graphic 27, during the evaluation of wrist at rest, it is possible to notice that in group A after treatment with Kinesio Taping, the ROM T1 has improved of 10,3 degrees; the ROM T2 has improved of 13,3 degrees; the ROM T3 has improved of 9 degrees and the ROM T4 has improved of 6 degrees.

In Group B after treatment with passive mobilization, the ROM T1 has improved of 9,5 degrees; the ROM T2 has improved of 6,1 degrees; the ROM T3 has improved of 4,2 degrees and the ROM T4 has improved of 1,4 degrees.

The best result it is with the application of Kinesio Taping, especially during T2, where the value is lower than all other circumstances.

In Group B the lower value is during T1, but after that, the value begins to increase, and during T4 there is only an improvement of 1,4 degrees, while in Group A there is an improvement of 6 degrees. Thus, Group A obtained the best result.

As shown in Graphic 33, during the evaluation of wrist during passive extension, it is possible to notice that in Group A after treatment with Kinesio Taping, the ROM T1 has improved of 8,9 degrees; the ROM T2 has improved of 12,1 degrees; the ROM T3 has improved of 7,1 degrees and the ROM T4 has improved of 6 degrees.

In Group B after treatment with passive mobilization, the ROM T1 has improved of 9,4 degrees; the ROM T2 has improved of 7,2 degrees; the ROM T3 has improved of 3,9 degrees and the ROM T4 has improved of 1,8 degrees.

The best result is in the Group B, with 9,4 degrees of improvement, while the Group A has 8,9 degrees of improvement.

So the best result it is with the passive mobilization for the value T0-T1, while for the other value, the application of Kinesio Taping is better.

As shown in Graphic 39, during the evaluation of metacarpal phalangeal at rest, it is possible to notice that in Group A after treatment with Kinesio Taping, the ROM T1 has improved of 13,8 degrees; the ROM T2 has improved of 16,6 degrees; the ROM T3 has improved of 10,4 degrees and the ROM T4 has improved of 6,8 degrees.

In Group B, after treatment with passive mobilization, the ROM T1 has improved of 12,8 degrees; the ROM T2 has improved of 8 degrees; the ROM T3 has improved of 4 degrees and the ROM T4 has improved of 1 degrees. Therefore the best result is with the application of Kinesio Taping, especially during T2, where the value is lower than all other circumstances.

In Group B the lower value is during T1, but after that, the value begins to increase. During T4 there is only an improvement of 1 degrees, while in Group A the value begins to increase after T2, but the value is much lower than T0. During T4 there is an improvement of 6,8 degrees.

Thus, Group A obtained the best result.

As shown in Graphic 45, during the evaluation of metacarpal phalangeal during passive extension, it is possible to notice that in Group A, after treatment with Kinesio Taping, the ROM T1 has improved of 8,8 degrees; the ROM T2 has improved of 11,2 degrees; the ROM T3 has improved of 7 degrees and the ROM T4 has improved of 5,1 degrees.

In Group B after treatment with passive mobilization, the ROM T1 has improved of 9,9 degrees; the ROM T2 has improved of 6 degrees; the ROM T3 has improved of 3,5 degrees and the ROM T4 has improved of 1,2 degrees.

The best result is in the Group B, with 9,9 degrees of improvement, while the Group A has 8,8 degrees of improvement.

So the best result it is with the passive mobilization for the value T0-T1, while for the other values, the application of Kinesio Taping is better.

After evaluating these data, we can observed that all the values are better in the study group, except for evaluation of wrist and metacarpal phalangeal during passive extension, where the best results it is with the passive mobilization for the value of T0-T1.

In general, we can notice that the best result for the patients treated with Kinesio Taping is during T0-T2 because T2 is the second day of application of Kinesio Taping, and in these moments the tape is more effective. The values of T3 and T4 the effects of Kinesio Taping is lesser, and it loss his efficacy.¹ The values of T3 and T4 are, however, lower than the starting values of T0. For these reasons we can say that the treatment with the application of Kinesio Taping is effective.

In addition, we can notice that the best result for the patients treating with passive mobilization is during T0-T1 because T1 is the evaluation immediately after the mobilization. During this evaluation, there is more effect, while after some day, such as T3 and T4, the effects of mobilization are minor and the values returned nearly to T0. As the article “Recupero della forza muscolare dopo precoce mobilizzazione passiva nel paziente emiplegico” says, in the early stages of stroke is necessary do an

¹ Kase K., Wallis J., Kase T., “Clinical Therapeutic Applications of the Kinesio Taping Method”, Kinesio Taping Association, Tokyo, 2nd edition, 2003, p.12

intense mobilization of the paretic or plegic limb, but these must be done every day, because the effects are temporary.

Before starting this study, I was expecting that the Kinesio Taping would give me good results. Although the EDF method is a new technique of application and thus has not been studied thoroughly.

In particular I got good results during the first and second day of application (T1 and T2), as the Kinesio Taping has especially short-term effects.

Studies concerning the EDF method are still in development, but the Kinesio Taping in neurology is still used by more time doing excellent results.

It's possible to cite some studies or articles that demonstrate the effectiveness of Kinesio Taping in neurology.

The first of these is the article: "La Tetra Paresi Spastica: il Taping kinesiologico applicato nelle patologie neurologiche". Testing was based on the path of a child with spastic tetra paresis. Initially the child was walking normally and then after the application of Kinesio Taping; and it was noted that the Kinesio Taping helped in inhibiting the adductor muscles of the leg and triceps, and the patient was walking with less effort.²

A second article that shows the effectiveness of Kinesio Taping is: "Kinesio taping in stroke: Improving Functional Use of the Upper Extremity in Hemiplegia". The purpose of this article is to present the Kinesio Taping method used to improve the upper extremity function in an adult with hemiplegia. The result is that the use of Kinesio taping method in conjunction with an established rehabilitation program may play an important role in the reduction of post stroke shoulder pain, soft tissue inflammation, muscle weakness and postural malalignment. The Kinesio Taping improves the position of gleno-humeral joint and provides the proprioceptive feedback to achieve proper body alignment.³

² KinesioBellia, "La Tetra Paresi Spastica: il Taping kinesiologico applicato nelle patologie neurologiche", <http://kinesiobellia.com/la-tetra-paresi-spastica-il-taping-kinesiologico-applicato-nelle-patologie-neurologiche/>, Accessed September 3, time 19.20

³ Jaraczewska E., Long C., "Kinesio taping in stroke: Improving Functional Use of the Upper Extremity in Hemiplegia", *Top Stroke Rehabilitation*, 2006, 13:31-42

The kinesio Taping was also studied in patients with multiple sclerosis, and the pilot study was described in the article: “Effect of Kinesio Taping on standing balance in subjects with multiple sclerosis: a pilot study.” This study also has demonstrated the effectiveness of Kinesio Taping.⁴

During this study there wasn't a chance to test the effectiveness of Kinesio Taping along with the passive mobilization, but it would be useful for a further study to determine if the application of Kinesio Taping after passive mobilization increases the effectiveness of the mobilization or if it maintains longer, and not only for T1.

⁴ Cortesi M., Cattaneo D., Jonsdottir J., “Effect of Kiensio taping on standing balance in subjects with multiple sclerosis”, *Neurorehabilitation*, 2011, Vol.28, pp.365-372

Conclusion

The purpose of this study is to demonstrate the efficacy of Kinesio Taping in the treatment of spasticity for patients affected by stroke. The goal was the reduction of spasticity in the upper limb and the increase of the ROM.

Moreover, a further aim was to demonstrate that the results achieved by patients in the experimental group (Group A) are better than the treatment of passive mobilization which was made in the control group (Group B).

The approach with Kinesio Taping has proved successful, indeed, from the result obtained, is clear that patients suffering from spasticity, who were treated with the application of Kinesio Taping, show statistically significant results compared to those of the control group.

Furthermore, the effectiveness of the treatment of the experimental group lasted longer than that of the control group.

Despite this, it is necessary to consider all the limitations of this study, and especially the fact that for this study only twenty patients were examined, which may not be representative of the entire population of patients with spasticity.

In conclusion, the present work, detailing a pilot study's features, aims to be the starting point for future works, able to exceed the present study's limits, in the aim to define a better guidance for the physiotherapist in the choice of the best tools to achieve a specific therapeutic objective for the reduction of spasticity.