



Does kinesio taping improve the functionality and pain relief of people with non specific low back pain?

González Enciso, J.R.

European School of Physiotherapy, Hogeschool van Amsterdam, Tafelbergweg 51, Amsterdam, The Netherlands

June, 2009

Abstract

Objective: Find out if kinesio taping is effective to decrease pain and gain functionality in patients with non specific chronic low back pain. **Method:** This is a randomised controlled trial (with stratification). Before intervention, the mean scores of the participants in the Quebec Back Pain Disability Scale (QB), the Roland Disability Questionnaire (RD) and the Oswestry Low Back Pain Disability Questionnaire (OL) were calculated. Then participants were treated with Kinesio taping (Group Kinesio taping) or with Exercise Therapy (Exercise Group). After being treated the tests were filled in again and the improvements were calculated by difference in means. Included were adults between 20 and 50 years suffering from chronic non specific low back pain. In total data of 8 subjects was analyzed. **Results and conclusion:** To our outcomes no significant differences were found when comparing the results before and after the intervention. Kinesio taping doesn't seem to be effective. In the other hand, exercise therapy improved moderately the disability and pain of the participants. Therefore, the size number was not enough to get proper conclusions.

© Hogeschool van Amsterdam, All rights reserved.

Keywords: Non specific low back pain, chronic low back pain, kinesio taping.

Introduction

Non specific low back pain

Low back pain can be caused by many factors. 90% of low back pain is caused by benign and auto limited causes such as joint injuries (youth arthrosis

or intervertebral disk physiological degradation) or soft tissue disorders (muscular or ligament injuries) (European Commission, 2005). These injuries are usually caused by a loss in the bones' strength, elasticity and muscular tone, common while we get older. Intervertebral disks start to lose liquid and

flexibility what decreases the capacity of protecting the vertebrae and the spine structures in general (Melchor L. et al 2008).

Low back pain could be also caused by visceral disorders around the lower back (Web 1). Other causes are traumatic (vertebral fractures, espondilolisis...), metabolic (fractures caused by osteoporosis), tumoral, infections, or acceleration of the disk degeneration after a slipped disk surgery (Melchor L. et al. 2008 and Web 1).

The diagnosis of the non specific low back pain is controversial (European Commission, 2005). A lot of aspects are not completely clear and some pathogenic mechanisms are not completely understood (European Commission, 2005). It seems difficult to diagnose correctly the non specific low back pain, but according to scientific literature it's clearer which causes of chronic low back pain we can exclude from the "non specific" diagnosis (European Commission, 2005 and Garcia F. et al. 2005):

- Osteoporosis
- Bone disorder in the spine (espondilosis, fracture...)
- Slipped intervertebral disk
- Stenosis in the lumbar spine
- Radicular nervous compression
- Infection in the spine (Discitis or others)
- Meningitis
- Congenital back disorder
- Arthrosis
- Autoimmune disorder (rheumatoid arthritis or others)
- Cancer, HIV and other important illnesses that cause pain in the lumbar area

Epidemiology lowback pain

Pain is a major cause of morbidity, with the low back being one of the most common locations of symptoms (Mannion A.F. et al. 2007). Therefore, pain in the soft tissues of the back is extremely common among adults (Punnet L. et al. 2005) and more concretely within the outpatient orthopaedic setting, where patients with lumbar pain often comprise the majority of the caseload (Resnik L. et al. 2003, and Resnik L. et al. 2005). Therefore, low back pain has a considerable impact on both the individual sufferer and society at large (Mannion A.F. et al. 2007); It is a worldwide costly illness for

the health systems (Assendelft W.J. et al. 2003), mostly in developed countries (European Commission, 2005), being the first cause of disability and loss of quality of life between individuals that are less than 45 years old (WHO, 2005). In many countries, more people are disabled from working as a result of musculoskeletal disorders (especially back pain) than from any other group of diseases (WHO, 2005). Some studies report that managing low back pain and the work disability that causes lead to costs from 20 to 50 million dollars per year (European Commission, 2005).

Assessed outcomes for low back disability.

Some of the assessed outcomes for low back disability are pain outcomes, back-specific function, general health status, work disability, or patient satisfaction (Chou R. et al. 2007).

Pain is a multidimensional experience that is a prominent feature of many musculoskeletal disorders. Despite its subjective nature, pain is a highly relevant complaint (Mannion A.F. et al. 2007). On balance, for the assessment of pain intensity, categorical scales with verbal descriptors or numerical rating scales seem to be preferable to traditional visual analogue scales, although no single best measure can be recommended (Mannion A.F. et al. 2007).

Between the categorical scales with verbal descriptors it was found that the Oswestry Low Back Pain Disability Questionnaire is widely used in the evaluation of patients with low back pain and it has good evidence qualities (Raymond W.J.G, et al. 2004).

But outcome assessment of low back disability is complex and involves multiple dimensions. Pain is not synonymous with function or quality of life, and other tools covering these important outcome dimensions should complement the assessment of pain, especially in patients with chronic symptoms (Mannion A.F. et al. 2007, and Deyo R.A. et al. 1998).

For back-specific functional status it was found that the Roland Disability Questionnaire and the Quebec Back Pain Disability Scale have strong qualities

(content and construct validity, feasibility, linguistic adaptation and international use) and they are also commonly used (Calmels P. et al. 2005).

Treatments for non specific low back pain

Many non pharmacologic therapies are available for treatment of chronic low back disability and a lot of trials and reviews to demonstrate the effectiveness of these therapies have been done. But, still, it's not clear which the most effective treatment is.

Good evidence was found that cognitive-behavioural therapy, exercise therapy, spinal manipulation, and interdisciplinary rehabilitation are all moderately effective for chronic (>4 weeks' duration) low back pain (Chou R. et al. 2007 and Assendelft W.J. 2003). Fair evidence was found that acupuncture, massage, yoga (Viniyoga), and functional restoration are also effective for chronic low back pain (Chou R. et al. 2007).

Sometimes, and mostly in Spain it's thought that spinal manipulative therapy is superior to other standard treatments for patients with chronic low back pain but this is not demonstrated in the evidence (Assendelft W.J. 2003).

In the other hand, kinesitherapy seems to be more effective, in the long term, than passive modalities (Chou R. et al. 2007), the exercises being more useful within multidisciplinary programs, above all if they are aimed at facilitating return to daily activities and reincorporation to work. There does not seem to be any superiority of one type of exercise over another (Chou R. et al. 2007).

Therefore controversy in therapy selection is big. The great variety of therapies that can be used to treat the non specific low back pain makes difficult to choose only one as the best.

Kinesio taping

The Kinesio taping could be a new option to decrease the disability of chronic low back pain.

Kinesio taping is becoming a commonly used technique for many health disorders (sprain ankle, oedema, muscular stiffness, loss in range of

motion...) in countries such as Spain or Italy. But not enough evidence about its effectiveness was found in the scientific databases. When introducing the words Kinesio taping in Pubmed, 7 articles were just found. Kinesio taping is also known as neuromuscular taping. When introducing these words in Pubmed 15 articles were just found. When introducing kinesio taping or neuromuscular taping in Mesh Term searcher no results were found.

More concretely, only one article about low back disability was found. The purpose of that study was to determine the effects of kinesio taping on trunk flexion, extension, and lateral flexion. Based on the findings, they determined that kinesio taping applied over the lower trunk may increase active lower trunk flexion range of motion (Yoshida A. et al. 2007).

We want to assess the effectiveness of the kinesio taping since it could be a cheaper, more effective and faster option for physiotherapists in the non specific low back pain approach.

Methods

Design of the Study

A randomised (with stratification) clinical trial was conducted (March- May 2009).

The study participants

The participating subjects were adults (women and men) from 20 to 50 years old, all suffering from chronic (more than 4 weeks) non specific low back pain. Subjects were recruited in the physiotherapy private center "Fisioterapia Albufera", located in Madrid, Spain.

Exclusion criteria

They were not admitted in the study if any of the following criteria were present:

- Osteoporosis
- Bone disorder in the spine (espondilosis, fracture...)
- Slipped intervertebral disk (with or without surgery)

- Stenosis in the lumbar spine
- Radicular nervous compression
- Infection in the spine (Discitis or others)
- Meningitis
- Congenital back disorder
- Arthrosis
- Autoimmune disorder (rheumatoid arthritis or others)
- Cancer, HIV and other important illnesses.
- Tumour in the lumbar area
- Lumbar fixation surgery
- No sciatic pain present
- Use of any analgesic during the last 2 weeks
- Received treatment for the back pain during the last 2 weeks
- No agreement with the consent form
- Patients that come to the center because of low back pain
- To ensure the diagnosis of these exclusion criteria we will be based on the diagnosis of the doctors that previously assessed the participants.

Implementation process

A first small questionnaire with the eligibility criteria to enter the study was given to all the patients coming to the center “Fisioterapia Albufera” during the recruitment period of 1 week.

Then the study was presented to the participants that were able to participate on it (one by one) according to the criteria. In short introduction, subjects were informed about the study to be conducted. They were not informed about the objectives, comparison or hypothesis of the study. They were just informed about the study as a “physiotherapy study for university, in which you will receive proper treatment by professional physiotherapists”. The steps of the study were not mentioned in advance.

The rules that participants must follow during the study were explained properly. It was ensured that they were sincere since they knew that a bad performance in the study could affect negatively the result of it and could make it useless. They signed

in the consent form where they accepted to participate in the study, following clear rules that were described in the consent form.

If they accepted to participate in the study by signing the consent form they were randomly allocated into an intervention group. Afterwards, they were contacted by phone to arrange a meeting for the first of the 4 sessions of the study.

In the first session we gave them another small questionnaire where age, weight, height, address, mail and telephone number were controlled. After this, three assessment tools were given to the participants, the Quebec Back Pain Disability Scale, Oswestry Low Back Pain Disability Questionnaire and the Roland Disability Questionnaire. In the same session an external expert in Kinesio taping applied the kinesio taping to the “Kinesio taping group” and another physiotherapist, explained the exercises that the participants of the “exercise group” followed at home (Web 5) and the postural changes they should apply to their daily work and activity.

The second session of the “Kinesio taping group” was five to seven days later. The kinesio taping expert retired the kinesio taping and applied a new one (same way). The “Exercise Group” participants came two days after their first session to control if they learnt properly the exercises. Afterwards they were contacted by phone (once per week) during the intervention to ensure that they were following their therapy.

In the third session of the “Kinesio taping group”, five to seven days later from the second session, the taping was removed again and a new one was applied.

In the forth and last session all the participants filled in again the three assessment tools, the Quebec Back Pain Disability Scale, the Oswestry Low Back Pain Disability Questionnaire and the Roland Disability Questionnaire.

Interventions

Patients with non specific chronic low back pain were randomised to receive kinesio taping treatment (“Kinesio taping group”) or exercise therapy and postural re-education (“Exercise group”).

For the application of the kinesio taping, an external expert, Irene, applied it in the lumbar area according to the knowledge she got in the official course “ANEID, Curso Básico de Vendaje Neuromuscular” that allows her to apply kinesio taping in Spain. Irene chose the protocol, since this was a pilot study and there’s no evidence about the effectiveness of any protocol. The kinesio taping was applied to the participants of the “Kinesio taping group” 3 times. One at the first session after randomisation, and the others in other 2 more sessions. Each session was separated by 5-7 days. Irene changed the previous taping and applied the new one on each session. The position was the one you can see in this link, since it’s an easy, common and reproducible application (<http://www.kinesiotaping.com/back.php>).

A table of exercises that was proven to be effective according to evidence was used (Garcia et al, 2005, Web 5) as intervention for the exercise group. A physiotherapist of “Fisioterapia Albufera”, David, explained the participants the exercises two days to ensure that they understood and reproduced the exercises correctly. In the second session, patients should be able to understand all the exercises correctly and reproduce them.

David gave advisements about posture at work and with daily activities. Participants were asked about their postural habits at work and at home and concrete corrections were given.

We contacted them by phone (once per week during the three weeks of the study) to prove that they were following the therapy.

Hypotheses.

In the current study the alternative hypothesis that kinesio taping is effective to decrease the pain and increase the functionality in patients with chronic non specific low back pain was tested.

Outcomes

The Quebec Back Pain Disability Scale has a maximum of 100 points (from smaller to greater disability, being 100 the worst result possible.):

It’s currently proposed that an difference of 20 points is a good improvement (Ostelo RW et al.). Our outcome is that patients report a decrease of 20 points in the score of the Quebec Back Disability Scale at the last session of the project comparing it with the score they got in the first session. So a difference in means of 20 points (decreasing) between the results in both sessions will tell us that the therapy was completely satisfactory to our expectations.

The Oswestry Low Back Pain Disability Questionnaire has a maximum of 50 points (from smaller to greater disability). It’s currently proposed that a decrease of 10 points between the results of the first session and the results in the last session is a meaningful improvement (Ostelo RW et als. 2008). In the Oswestry Questionnaire, a difference in means of 10 points (decreasing) between the results in both sessions will tell us that the therapy was completely satisfactory to our expectations.

Roland Morris Disability Questionnaire. It has a maximum of 24 points. 24 points is the greater disability possible according to this test. An improvement of 5 points between the two times when the test is passed to the patients is currently considered as a meaningful improvement (Ostello RW et als. 2008). In this case, a difference in means of 5 points (decreasing) between the results in both sessions will tell us that the therapy was completely satisfactory to our expectations.

David passed the tests to the participants in the study as described before, in the first session and in the last session of the study.

David was a blinded assessor, he didn't know about the group's assignment and about the study hypothesis outcomes and objectives

Randomisation

As mentioned before, the first small questionnaire was passed to all the patients that came to the center because of any other problem that low back pain during the recruitment period of 1 week. If they met the criteria to enter the study they were divided in women and men and in patients that were between 20 and 35 years old and between 36 and 50. This stratification was done before randomization to ensure similar baselines in both groups.

The groups before randomisation were the following:

- Women between 20 and 35 years old
- Women between 36 and 50 years old
- Men between 20 and 35 years old
- Men between 36 and 50 years old

Then, the name of the patients that met the criteria to participate in the study and were agree with the conditions and rules by signing the consent form were written one by one in different papers. These

papers were introduced in their respective group before randomisation.

Afterwards the papers were closed and the secretary of "Fisioterapia Albufera" took one by one of each "before randomisation group" and put them in the the Exercise group and in the Kinesio taping group alternatively.

To ensure a proper randomisation, Begoña, the secretary's office of the center received the papers when they were already closed and she selected the ones to put in both intervention groups.

Blinding

The physiotherapist applying the intervention just explained the technique that they were going to apply to the patient. If the patients asked about effectiveness, physiotherapist should answer that they were trying this therapy, but they don't really know if it works. No greater explanations were given.

Begoña passed the questionnaires to the participants without giving them additional information about the objectives of it. In the first time that they filled in the questionnaire they didn't know which the next step was and of course, they didn't know that they were going to fill in the same questionnaire some days later.

Statistical methods

To store and analyze the data Microsoft Excel and SPSS were used. An external collaborator for this field, Miguel Angel Mestres, biologist with a lot of statistical experience, working currently in the scientific field, helped us to get the most interesting results. Age and gender baseline of both groups were calculated (in the case of gender by counting the numbers, but in the case of age by mean). Weight and height were also included in baseline.

The outcomes results in the comparison groups were compared. We calculated the difference between mean results in the first accomplishment of the questionnaires and the mean results in the second time they filled in the questionnaires.

Results

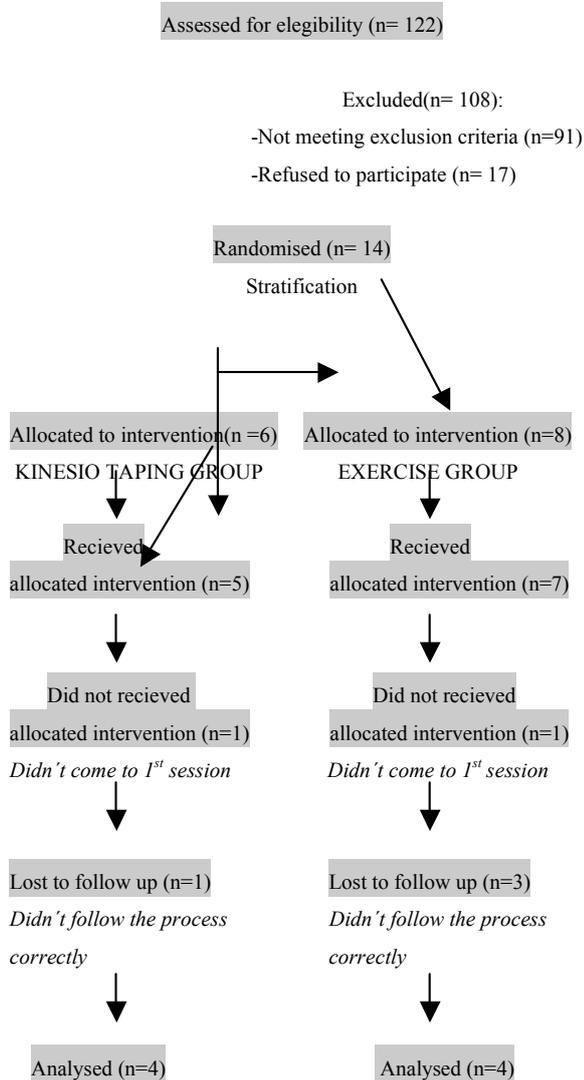


Fig. 1 Flow of participants through each stage

Protocol deviations from study as planned, (intention to treat failures).

4 participants didn't follow the protocol correctly. In the case of the Kinesio taping group, one patient didn't come to the second session. Within the Exercise group, 3 participants told by phone that they were not following the protocol correctly.

The rest of the participants were treated according to previous intentions.

Baseline of groups (means)	Kinesio taping group	Exercise group
Weight	68. 7 kg	70. 2 kg
Height	1.73 m	1.74 m
Age	40. 5 years	38. 4 years
Gender	2 women/ 2 men	2 women/ 2 men

Fig. 2 Baseline characteristics of both groups.

Summary of results for each group

	Quebec before	Quebec after	Oswest. before	Oswest. after	Roland before	Roland after
	32	20	17	9	9	7
	74	70	41	30	19	15
	67	72	38	38	20	16
	56	50	34	40	19	21
Average	57. 25	53	32.5	29.25	16.75	14.75
Tip. deviat.	+18. 4	+24.1	+10.7	+14.2	+5.2	+5.8

Fig. 3 Exercise Group. Scores before and after intervention, average and typical deviation..

	Quebec before	Quebec after	Oswest. before	Oswest. after	Roland before	Roland after
	40	35	20	15	9	4
	60	56	30	23	15	12
	33	40	15	27	7	5
	54	60	22	34	11	17
Average	46.75	47.75	21.75	24.75	10.5	9.5
Tip. deviat.	+12.4	+12.1	+6.2	+7.9	+3.4	+6.1

Fig. 4 Kinesio taping group. Scores before and after intervention, average and typical deviation..

Mean differences (before – after)	Kinesio taping group	Exercise group
Quebec	+ 1 point (pvalue=0.77)	- 4.25 points (pvalue=0.31)
Oswestry	+ 3 points (pvalue=0.6)	- 3.25 points (pvalue=0.46)
Roland	- 1 point (pvalue=0.7)	- 2 points (pvalue=0.25)

Fig. 5 Differences in mean scores before and after the intervention in both groups. P values.

According to our outcomes we didn't find any significant differences in mean between the scores before and after the intervention in both groups.

The differences found were neither statistically significant, considering the differences significant when the p value is less than 0.05.

A decrease of 20 points was considered a good improvement within the Quebec Back Pain Disability Scale.

In the Kinesio taping group, the mean score after the treatment increased in 1 point. In the Exercise group we found a decrease of 4.25 points in the mean score. This is far from the outcome we considered a good improvement.

In the Oswestry Low Back Pain Disability Questionnaire a mean difference of 10 points (decreasing) between the results in both sessions was considered a satisfactory outcome to our expectations.

In the kinesio taping group the mean score after the intervention increased in 3 points. In the Exercise group we found a decrease of 3.25 points. This is an improvement, but also far from the outcome considered.

One participant in the Exercise group scored 11 points less after the intervention, meeting the satisfactory outcome expected.

In the case of the Roland Morris Disability Questionnaire a difference in means of 5 points (decreasing) between the results in both sessions was considered the outcome.

In the kinesio taping group we found a decrease of 1 point. In the exercise group the mean score decreased 2 points. Both results are also far from the result expected as satisfactory.

One participant in the Kinesio taping group scored 5 points less after the intervention, meeting the outcome expected.

Discussion

The alternative hypothesis of this study was that kinesio taping is effective to decrease the pain and increase the functionality in patients with chronic low back pain.

As mentioned before, we didn't find any significant difference (to our outcomes and statistically)

between the scores before and after the intervention in both groups.

Therefore, it seems that the Exercise therapy is more beneficial than kinesio taping when treating non specific low back complaints. In every test we found a greater (but not significant to our outcomes or statistically) improvement in the Exercise group.

The greater limitation for the interpretation of these results is the sample size. With a greater sample size we could get more relevant results.

It was very difficult to find patients that met the criteria. To our resources it was impossible to find more. If the study is reproduced in the future, it's highly recommended to work in bigger and financed groups and in many clinics and/or hospitals.

Another limitation is that the Oswestry test has been not validated in Spanish yet. It's commonly used also in Spanish language, but no studies about it's validity in Spanish language were found.

Conclusion

There seems to be a considerable improvement in low back pain and disability when treating the patient with exercise therapy. This was not enough to our outcomes but in all the tests there was a decrease in punctuation, what means an improvement in symptoms. These results were also found in Chou R. et al. (2007) or in Assendelft W.J. (2003) where they considered moderate the positive effect of exercise therapy in non specific low back pain recovery.

Still, there's no unity in the exercise programs used, and this could lead to malinterpretation of positive results. Therefore it's necessary to be specific when mentioning exercise programs in a study. We

should describe the exercise program concretely or give the reference available to find it.

No beneficial effects were found in Kinesio taping group; still, results cannot be generalize mainly because of the sample size and because of the lack of evidence available in this subject. It's needed to do more research and find more participants for future studies.

References

Assendelft WJ, et al (2003). *Spinal manipulative therapy for low back pain. A meta- analysis of effectiveness relative to other therapies.* Annals of Internal Medicine 138 (11), pp. 871- 881.

Bronfort G et al (2004). *Efficacy of spinal manipulation and mobilization for low back pain and neck pain: a systematic review and best evidence synthesis.* Spine J. 4(3):335-56

Carmels P. et al (2005). *Low back pain disability assessment tools.* Annals Readapt. Med. Phys. 48 (6), pp. 288- 297.

Chou R et al. (2007). *Nonpharmacologic therapies for acute and chronic low back pain: a review of the evidence for an American Pain Society/American College of Physicians clinical practice guideline.* Annals of Internal Medicine. 147(7), pp 492-504.

Deyo RA et al.(1998). *Outcome measures for low back pain research. A proposal for standarized use.* Spine. 15; 23(18), pp. 2003-13

Fernando García Pérez et al. *Bases científicas para el diseño de un programa de ejercicios para el dolor lumbar.* (Found in <http://www.sermeef.es/>)

Garcia Perez F. et al. (2003). *Importance of physical exercise in the treatment of non-specific low back pain*. *Rehabilitación*, 37 (6), pp. 323-332.

Laura Punnett et al. (2005). *Estimating Exposures the global burden of low back pain attributable to combined occupational*. Preprint for American Journal of Industrial Medicine (Found in <http://www.who.int/en/>).

Mannion AF. et al (2007). *Pain measurement in patients with low back pain*. *Nat. Clin. Pract. Rheumatol.* 3 (11), pp. 610- 618.

Maurits van Tulder et al. (2005). *European guidelines for the Clinical Management of Non-Specific Low Back Pain*. European Comission, COST program.

Melchor L. et al. (2005). *Book: Evaluación del paciente con dolor lumbar*. pp. 135- 208

Melijoglu MA et al. (2009). *Validation of the Turkish version of the Quebec back pain disability scale for patients with low back pain*. *Spine*, 15; 34 (6), pp. 219- 224

Ostelo RW et al. (2008). *Interpreting change scores for pain and functional status in low back pain: towards International consensus regarding minimal important change*. *Spine*. 33 (1), pp. 90- 94.

Raymond W.J.G. et al.(2004). *24-item Roland-Morris Disability Questionnaire was preferred out of six functional status questionnaires for post-lumbar disc surgery*. *Journal of Clinical Epidemiology* 57, pp. 268–276

Resnik L. and Dobrzykowski E. (2003). *Guide to outcomes measurement for patients with low back*

pain syndromes. *Journal Orthopedic Sports Physical Therapy*. 33 (6), pp. 307- 316.

Resnik L. and Dobrykowski E. (2005). *Outcomes measurement for patients with low back pain*. *Orthopedic Nursing*, 24 (1): 14- 24.

Web1:

<http://www.cun.es/areadesalud/enfermedades/sindromes-y-sintomas/dolor-lumbar-cronico/>

Web2:

http://espanol.ninds.nih.gov/trastornos/dolor_lumbar.htm

Web3:

<http://www.kinesiotaping.com.es/vendaje-neuromuscular-kinesiotaping-flexibilidad.html>

Web4:

http://journals.lww.com/spinejournal/Abstract/1997/09150/Conservative_Treatment_of_Acute_and_Chronic.12.aspx

Web5:

<http://www.sermef-ejercicios.org/>

Yoshida A, Kahanov L. (2007). *The effect of kinesio taping on lower trunk range of motions*. *Res Sports Med.* 15 (2), pp. 103-12