

# Impact of Kinesio Taping application on pregnant women suffering from pregnancy-related pelvic girdle pain — preliminary study

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## ABSTRACT

**Objectives:** The aim of the study was to assess the impact of pregnancy-related pelvic girdle pain on every day functioning and evaluate how effective Kinesio Taping is in reducing pain for pregnant women.

**Material and methods:** 24 women filled the author's questionnaire, Oswestry Disability Index Questionnaire and Pelvic Girdle Questionnaire before starting the therapy. Elastic tape was applied onto the lumbosacral area for 5 days and was evaluated 1<sup>st</sup> day of the test immediately before application, day 2, 3, 4, 5, 6 and 10 day of the examination.

**Results:** ODI score was 20.09 and showed major disability resulting from severity of the pain. PGQ score was 19.909. Significant pain reduction was registered on the 3<sup>rd</sup> day after tape was applied, significant pain reduction on the day of tape removal, and 5 days after tape removal.

**Conclusions:** Elastic tape decreases pain in pregnancy-related pelvic girdle pain. Pelvic girdle pain deteriorates the quality of life for pregnant women.

**Key words:** pregnancy, pelvic girdle pain, disability evaluation, pain management

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## INTRODUCTION

Pelvic girdle pain in many cases used to be misdiagnosed as low back pain because of the similar nature of ailments: tingling, numbness, subjective feeling of weakness in limbs with reduced functionality, the sense of instability while walking, and radiation of the pain [1]. In addition, the pelvic pain is associated with instability of the lumbosacral complex what is connected with altered laxity and stiffness forces and leads to increased joints translations [2]. Asymmetrical immobilization in the sacroiliac joints is associated with asymmetric muscular tension [3, 4]. Pregnancy-related pelvic girdle pain (PPGP) appears at the end of the 1st trimester and usually lasts until the end of the first month after child delivery. PPGP is most severe between weeks 24 through 36 of pregnancy. The etiology of the problem remains unclear, and it is believed that there

are a lot of causes: hormonal, biomechanical, metabolic, genetic or degenerative [5, 6]. A prior history of similar ailments or trauma of the pelvis increases the risks. The severity of PPGP fluctuates according to a study within the range of 50–60 mm VAS scale (Visual Analogue Scale) [6]. Posture during the occurrence of PPGP is characterized by excessive snap with increased antetorsion of the pelvis while seated or the patients has a “swayback” posture type [3, 7]. We can observe the deterioration of coordination (increased rotational amplitudes of pelvis, lumbar segment and thorax), slower gait, followed by increased rotation of the pelvis relative to the chest [8]. Management of the pelvic girdle pain according to journals includes: water gymnastics, bed rest, pelvis stability exercises, avoiding movements which can cause the pain, and acupuncture [2, 5, 9–13]. A single report on the application of: massage therapy, thermothe-

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rapy, mobilization, manipulation, as well as lap belts can be found in the journal referenced [5]. In some cases pain killers like Paracetamol may be used for treatment of women with PPGP, however it is not recommended [2, 14].

In the 1970s Dr. Kenzo Kase developed a type of elastic tape applied on the skin which uses the body's natural ability of self-regeneration. The development of new methods and the creation of the Kinesio Taping Association International (1984) has increased the need for research evaluating the effectiveness of taping [15–19]. Kinesio Tex Gold elastic tape is the original Japanese product quality certified by the CE (Conformité Européenne) (National industrial chemical notification and assessment scheme, 1995).

Tape Kinesio Tex Gold consists of cotton and acrylic copolymer. The surface of the tape is not uniform, but interrupted by wave-shaped folds allowing skin contact with the air and protecting against burns. Kinesio Tex Gold directly affects the skin (Ruffinis receptors, pain receptors, deep sensory receptors) and indirectly the lymphatic system, fascia, muscles and ligaments. Acrylic medical glue is activated by heat, and during application it does not seep into the vascular system. It does not have any impact on the fetus. Occasionally, with longer lasting applications (over a week), it can cause skin irritation in susceptible people.

No side effects are observed in the patients using elastic tapes, that is why this modern and non-invasive method is widely used by practitioners for management of pain. In recent years, Kinesio Taping (KT) physiotherapy method has been used to decrease and prevent pain in women suffering from PPGP due to the effect of increased muscle relaxation while taping is applied [14, 20].

## OBJECTIVES

The aim of the study was to assess the impact of PPGP in pregnant women on their everyday functioning and quality of life and the evaluation of the effectiveness of KT method on the subjective feeling of pain in pregnant women suffering from PPGP.

## MATERIAL AND METHODS

Approval of the Medical University Ethics Committee has been obtained (KB-551/2012 of 11/07/2012) before the study.

### Patients

Sixty three pregnant women from Birthing School, suffering from pain in lumbosacral area were recommended to enroll into the study between July and December of 2013. In 39 cases PPGP was diagnosed. Thirty three patients with this dysfunction agreed to enroll into the study. Four withdrew from the study due to skin irritation (allergic reaction) after application of the tape, five failed to return the questionnaire at the conclusion of the study, three gave birth during

the study. Ultimately twenty four patients recruited at the Birthing School were included in the study.

Inclusion criteria:

- age: 20–35 years old;
- 18<sup>th</sup>–34<sup>th</sup> week of pregnancy;
- at least one positive test out of three applied in the diagnoses of PPGP;
- negative Straight Leg Rise test.

Exclusion criteria:

- history of prior pelvic injury;
- skin lesions in the lumbosacral area;
- negative diagnostic tests for pelvic girdle pain and/or positive Straight Leg Rise test;
- chronic pelvic diseases;
- history of allergies to acrylic copolymer.

Included patients were informed about the potential benefits and possible side effects of therapy and the ability to withdraw from the research at any stage. Information concerning the purpose, test, the potential benefits or possible side effects as well as the possibility to withdraw from the research at any time during their lifetime was communicated verbally.

### Diagnostic tests

To assess the nature of the ailment, on the basis of the European Guidelines for Treatment and Diagnostics of PPGP [21] the following diagnostic tests were used:

- Long Dorsal Ligament Test (LDL) (modified for pregnant women). Test exhibits a sensitivity range of 0.11–0.74 and is highly specific at levels between 0.76–1.00 [10, 22, 23];
- Posterior Pelvic Pain Provocation (4P). Its sensitivity range is 0.69–0.93 with a specificity level of 0.80–0.98 [23–25];
- Trendelenburg test (modified for pregnant women). The sensitivity range of the modified Trendelenburg test is 0.4–0.62 with a specificity of 0.99 [22, 23, 26];
- Straight Leg Rise test (SLR). The sensitivity of the test is 0.52 with a specificity of 0.89 [27].

The LDLT, 4P and modified Trendelenburg test are specific to pelvic girdle pain. Tests 1 and 2 generated pain in the sacroiliac joints and adjacent soft tissues. 4P test is considered to be the most sensitive and specific test for pain generation in the sacroiliac joints. Modified Trendelenburg test generated pain in the pubic symphysis, which indicates pelvic impairment during load transfer from the trunk to the lower limbs.

SLR test was used to generate pain connected with disc root conflict, and was negative in tested women.

### Questionnaires

Pregnant women filled in the author's own disease questionnaire which has been prepared for the purposes of the study to indicate location of the pain [2]. The result of the

test-retest reliability within two days was outstanding for all studied questions (100% compliance). Because PPGP is defined based on the topography of the pain [2] participants answered questions about the nature and location of the lumbosacral pain before and during pregnancy.

In addition, patients were asked to fill out standardized questionnaires about: impact of lumbosacral pain during everyday activities: Oswestry Disability Index (ODI) and the characteristics as well as the impact of pregnancy-related pelvic girdle pain during everyday activities: Pelvic Girdle Questionnaire (PGQ).

ODI is a questionnaire about how lower back pain influences quality of life (QoL) and everyday functioning [28, 29]. Pelvic Girdle Questionnaire is designed to assess the quality of life in patients with pelvic girdle pain. The questionnaire is considered sufficiently responsive and representative for the assessment of QoL [6, 30].

### Kinesio Taping

Elastic tapes were applied in areas with the greatest mobility of the thoracolumbar fascia relative to muscles below (Fig. 1).

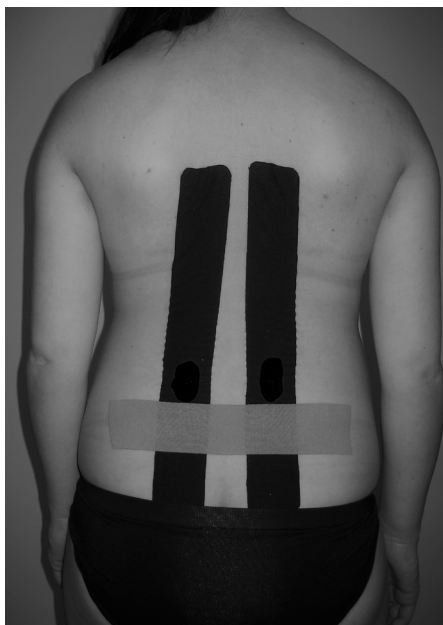


Figure 1. Kinesio Tex Gold applied on the lumbosacral area

Muscular application (2 tapes 40 cm in length) used on both sides of the spine. Distal part of the tape was attached 5 cm below superior posterior iliac spine, then in the spine flexion when the extensor muscles of the back were stretched, tape, stretched about 10% of the initial length was attached along the spine on both sides. After spine extending characteristic folds of this application could be observed.

Ligament Application I (one tape 20 cm in length) applied to the upright trunk. Tape was attached perpendicular to the previous tapes at a height of the sacroiliac joints with stretching 50% from baseline.

The treatment lasted 5 days. Participants analyzed intensity of the pain and filled out an appropriate survey before the therapy, then in the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> day of the treatment and at 6<sup>th</sup> and 10<sup>th</sup> day of the test (days without tape application) (0, 1, 2, 3, 4, 5, 6 — days of the assessment during the study respectively) (Fig. 2). Assessment of the pain was made using the VAS scale.

### Statistical methods

Statistical version 12 was used in the analysis of the results. The Shapiro-Wolf test was used to test normal distribution of the results. Depending on the outcome of the analysis of normality, Wilcoxon signet-rang test was used. Differences less than  $p = 0.05$  were interpreted as statistically significant.

## RESULTS

### Characteristics of participants

Results of 24 pregnant women were used for statistical analysis.

The mean patients' age was 30.16 years (SD  $\pm$  2.79), the mean weeks of pregnancy (HBD): 29.66 (SD  $\pm$  4,42), the average BMI of patients before pregnancy was 26.49 (SD  $\pm$  14.37).

### Analysis of the Kinesio Taping efficacy on PPGP based on the VAS score

Results of the KT method in managing of PPGP are in Table 1.

The average level of pain before tape application was 35.09 mm. A significant reduction of the pain was reported on the 3<sup>rd</sup> day after tape application and 5<sup>th</sup> day after application. After tape removal the important reduction in pain

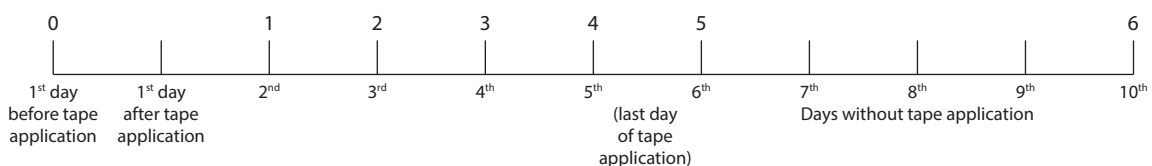


Figure 2. Days of the examination. 0, 1, 2, 3, 4, 5, 6 — numbers of the days when VAS was filled

**Table 1. VAS results (0–100 mm) in each successive days of study**

Day of the therapy when VAS was filled	0	1	2	3	4	5	6
Average score VAS [mm] <sup>a</sup>	35.09	33.36	24.68	25.86	23.5	20.8	19.72
Standard deviation [mm]	28.55	26.55	22.8	27.59	26.41	23.21	20.23
(p) <sup>b</sup>	–	0.831	<b>0.0424</b>	0.0800	<b>0.0123</b>	0.1213	<b>0.0334</b>

<sup>a</sup>VAS — Visual analogue scale; <sup>b</sup>statistical significance for each day of the pain assessment during the study contrasted against the first day (assessment before therapy) — Wilcoxon signet-rang test

score was observed in the 10<sup>th</sup> day of the test (points: 2, 4, 6 in the arrow respectively) (Fig. 2).

### Analysis of the impact of PPGP on the quality of life

ODI score was 20.09 (SD ± 5.999). Percentage ODI score in the test group was 44.64% (SD ± 11.55), reflecting the major disability resulting from the occurrence of pain [29]. Moderate disability was observed in 9 patients (the result of the percentage of ODI was 31.6% SD ± 5.06), severe disability was observed in 11 patients (the result of the percentage of ODI was 50.19%, SD ± 5.03), crippling back pain has been observed in 2 patients (ODI result was 69.99%, SD ± 7.86).

The average total PGQ questionnaire result was 19.909 (SD ± 10.98). In terms of percentage result is 28.8%.

## DISCUSSION

Severity of PPGP can be different, as a result of the progress of the disorders and subjective feeling of pain. According to one of the authors reports [5] an average severity of pain in PPGP is 50–60 mm scale VAS. In our study the result was 35 mm in VAS. Results may vary in studies and could be associated with different factors such as; pregnancy stage, different BMI, age of the pregnant women. Beyond the discomfort and pain, PPGP can also obstruct the performance of the activities of daily living and thus adversely affect the quality of life of pregnant women. In our studies, dysfunction moderately impaired the patient's ability to perform daily activities such as; bending, lifting, sitting, sleeping (according to ODI), housework, long walking, and standing (according to PGQ). Unfortunately, the options for pain therapy in pregnant women are significantly reduced, due to the possible danger to both the mother and the fetus. Most of the standard drugs used effect the fetus and are not recommended, especially for long-term treatment. In the Kaplan study [14] in the experimental group both KT and Paracetamol were used and compared alone to the Paracetamol treatment option in the control group. In the experimental group KT significantly reduced pain when compared to the control group. The main goal of our study was the assessment of whether KT reduces pain in subsequent days of use when compared to the pain assessment before application of KT. If pain reduction was observed it was interesting to see for how long such pain

relieve lasted. Based on the results we can state that KT significantly reduces pain in the studied group of pregnant women and this effect is maintained even after its removal. The tape, acting on skin mechanoreceptors and thoracolumbar fascia, causes relaxation of tense and overloaded tissues, which helps to change the intensity of the pain [16, 18]. On the basis of the above studies, it is difficult to ascertain why the reduced level of pain was maintained even after cessation of the therapy. It is alleged that elastic tape changes muscle tension and affects body posture but it should be a target for a wider study, with a larger number of patients. KT does not have affect the fetus and has very limited number of side effects that's why it can be used as the first- line therapy in PPGP. In the absence of satisfactory improvement reported by the patient, the practitioner should consider additional therapies. Because of the small number of participants in previous studies it is difficult to choose the best and the most effective tape application in the treatment of pain. In most of the research, the I type muscular application was chosen in the cases of lower back pain [19, 21]. In Sabbour and Omar studies [20], in patients suffering from lower back pain, Kinesio Taping method was used for a period of 2 weeks, 3 days on followed by a 24 hour break. Efficacy was estimated with use of VAS scale and ODI in two groups (a total of 60 people), where I type muscular application was chosen (along both sides of the spine with a voltage of 15%) or a ligamental application (perpendicular to the previous) in the pain area. Both applications were considered satisfactory. The usefulness of the method in the treatment of acute pain was evaluated in the study of Hwang Bo and Lee [31] (VAS scale and Oswestry Disability Index), with beneficial effects. Castro-Sanchez et al. [15] also reported reduction in pain feeling, classified according to the VAS scale, and improvement of quality of life but without statistical significance. Pain level tested in our study with use of VAS scale decreased in the 3rd day (24 hours after the tape application) and its low level continued throughout the assessment of patients, even in the 10th day of the study (5<sup>th</sup> day after tape removal). Duration of analgesia, and even a progressive decrease of complaints despite the end of the therapy came as a surprise to the researchers. Earlier observations [32] showed that recurrence of the complaints should be expected immediately after removing the tape. It can only be speculated that the use of KT therapy promotes,

in some cases, restoring the proper muscle tone, and then its maintenance by restoring the correct movement or postural patterns. KT can stop a vicious cycle in which pain forces non-physiological body alignment and causes muscle imbalance and tension. The limitations of the study is a lack of control group with placebo treatment. This comes from the specifics of studied therapy (in this case application of elastic plaster tape). It is not possible to hide the application of the plaster tape from the patient. Because of pregnancy pharmacotherapy was not proposed as an alternative treatment (if not necessary), which is what took place in our study. The women participating in the study did not use pain-control medication before the study and participants did not report such need during intervention as well as during observation time.

Our study was a preliminary one and future observation on a larger sample of participants is needed. Evidence of effectiveness of the KT as noninvasive and low side effect treatment of PPGP in pregnant woman is important for future guidelines.

## CONCLUSIONS

PPGP has negative impact on everyday functioning and quality of life during pregnancy. Elastic tape used in KT method can decrease pain and improve functionality in advanced pregnancy.

### Conflict of interest

None declared.

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