

Subject Area:

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Effect of Kinesio taping therapy on waist circumferences in postpartum women

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Abstract

Objective

The study was designed to examine the effect of Kinesio taping (KT) on abdominal circumferences in postpartum women with or without diastasis of rectus abdominus muscles (DRAM).

Participants and methods

A total of 26 women at 8 weeks postpartum, their age ranged from 25 to 35 years, their BMI was between 26.6 and 38.2 kg/m², suffering from increasing abdominal circumferences with or without DRAM, were referred from the outpatient clinic of the Gynecological Department of Shibeen El-Kom Teaching Hospital, All women received KT therapy on the abdomen. The treatment was applied for 4 consecutive weeks. Evaluation was done for all women before the start of the study, every week, and after 4 weeks of KT to evaluate their waist circumferences.

Results

There was a highly significant decrease in waist circumferences for the studied group, which was more apparent in younger women (age < 30 years), who had spontaneous vaginal delivery and in those complaining of DRAM.

Conclusion

The results of this study testified that KT is an effective method in reducing abdominal circumferences in postpartum women with or without DRAM.

Keywords: Abdominal circumferences, diastasis, Kinesio taping, rectus abdominis

INTRODUCTION

Pregnancy is a period of enormous change, both physically and mentally. It is associated with dramatic changes in a woman's body shape and size, and for many women, these changes are perceived negatively, resulting in body dissatisfaction, or a negative body image [1,2].

Waist circumference (WC) is one of the strongest predictors of attractiveness of female bodies for both front-view and side-view stimuli [3,4]. The undesired increase in abdominal circumference postpregnancy results typically from weight changes and/or weakening of the fibrous, connective tissue in the skin [5].

In addition, increasing stresses placed on the abdominal muscles and connective tissue structures during pregnancy and

childbirth may result in the stretching and sometimes splitting of the linea alba, resulting in a diastasis of rectus abdominis muscles (DRAM) [6].

Theoretically, the most popular cosmetic procedures for addressing body contouring and tightening are surgical in nature. While surgical correction undoubtedly produces the most definitive results, it also requires significant recovery time for patients and carries inherent risks. These factors, along with today's cosmetic patients' active lifestyles and desire for results with minimal potential sequelae, have spawned the development of many new noninvasive body

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contouring strategies to mitigate skin laxity and reduce body circumference [7].

Kinesio taping (KT) method is a relatively new technique and has become increasingly common over the last decade. It is currently regarded by physiotherapists as a method for supporting, rehabilitating, and modulating some physiological processes [8].

In the KT method, an elastic tape is applied to the skin to improve the circulation of fluids, which is expected to raise the natural healing power. It aims at functional improvement focusing on the myofascia. With regard to its effects, it improves muscle function and fluid circulation, suppresses pain and corrects joints, and prolongs the effect of treatments [9].

Besides, due to the impasse of the increase of abdominal circumference and the rise in its prevalence and troubling long-term consequences for women's health together with dissatisfaction about one's body shape, altered self-esteem, and disadvantage in interpersonal relationships, there is an intensive need for even practical, cheap, and noninvasive methods to adequately restoring physical attractiveness and preserving better health.

Accordingly, this study was conducted to investigate the effect of KT on abdominal circumferences in postpartum women with or without DRAM.

PARTICIPANTS AND METHODS

Participants

This study enrolled 26 women at 8 weeks postpartum referred from the outpatient clinic of the Gynecological Department of Shibeem El-Kom Teaching Hospital. Their age ranged from 25 to 35 years (with a mean value of 29.26 ± 4.28 years) and BMI of 32.76 ± 3.53 kg/m², suffering from increasing abdominal circumference with or without DRAM with no central obesity (waist-to-height ratio <0.5). They received explanations about procedures, after which they read and signed an informed consent. The duration of this study was 6 months from June 2014 to December 2014.

The exclusion criteria for this study ruled out: skin diseases, vaginal bleeding, vascular insufficiency, sensory and neurological defects, neoplastic or systemic diseases including hypertension or diabetes mellitus.

Materials

- (1) Weight–height scale was used to measure weight and height for each woman before starting the study.
- (2) A nonelastic measuring tape, used to measure WCs.
- (3) Cotton and alcohol are used to clean skin prior to KT application, to avoid anything that limits the adhesive's ability of KT to the skin that may alter both effectiveness and length of application.
- (4) ARES Kinesiology tape is an elastic therapeutic tape that is used for the Kinesiology taping method Godlisha Corp., Gwangmyeong-Si, Gyeonggi-Do, Korea.

Methods

Evaluation procedure

- (1) History taking: a detailed history was taken from each woman regarding parity (primiparous or multiparous) and type of last delivery (normal labor or cesarean section).
- (2) Anthropometric indices: these measures were taken while the participants were in a fasted state, in a standing position, dressed in light clothing and barefoot, with arms on side, legs straight, and knees together, with feet flat pointed outward.

Weight and height were measured for each woman using the weight–height scale to calculate the BMI by dividing reported weight in kilograms by reported height squared in meters.

In addition, the waist-to-height ratio was calculated for each woman to exclude central obesity through the formula of WC (cm)/height (m)/height (m) with (<0.5 no central obesity and ≥ 0.5 central obesity) [10].

Moreover, WCs were correctly measured using a nonelastic measuring tape that is perpendicular to the long axis of the body and horizontal to the floor, at the end of a normal expiration at different anatomic landmarks including: (a) the midpoint between the lowest rib and the iliac crest (WC), (b) just below the lowest rib (minimum WC), and (c) just above the iliac crest (widest WC) [11].

WC measurements were performed before starting the study, at the start of every KT setting and after 4 weeks of KT.

- (3) Manual assessment for the distance between two recti: manual assessment for the distance between two recti was done to confirm the presence of DRAM. To measure the distance between two recti, every woman rested in crook-lying position, feet supported, and arms extended over the body and asked to perform a forward trunk flexion until the inferior angle of the scapula is off the bed. Then the evaluator placed fingers perpendicularly between the medial edges of the rectus abdominis muscles. The reference points for DRAM measurement were three fingerbreadths (4.5 cm) above and below the umbilicus (Fig. 1a–c).

DRAM was graded by the number of fingerbreadths between the medial edges of the bellies of the rectus abdominis muscle at the reference points. Each fingerbreadth represented 1.5 cm, as found in the literature. The DRAM was considered present and relevant if the separation is greater than two-finger widths between the medial edges of rectus abdominis muscles [12].

Treatment procedures

All women received abdominal taping using (ARES Kinesiology tape) every week for 4 consecutive weeks. KT was applied with patient in a relaxed supine lying position with trunk extended and both arms flexed, and then abdominal skin was rapped using cotton and alcohol to decrease skin impedance.

KT was applied in the form of Kinesio 'I' strip technique using four 'I' strips; the first pair of KT strips measured from the origin of two recti at the pubis symphysis upwards toward its

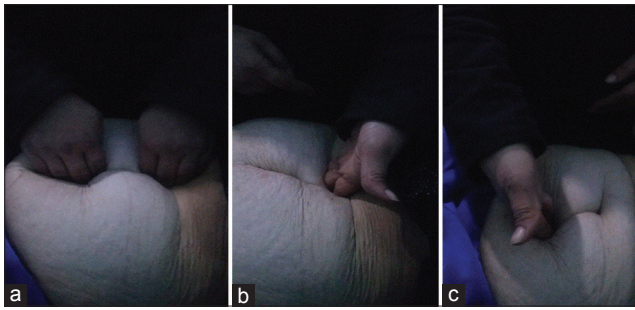


Figure 1: Manual assessment of the distance between two recti. (a) The evaluator placed fingers perpendicularly between the medial edges of the two recti. (b) The reference point for diastasis of rectus abdominus muscles measurement is three fingerbreadths (4.5 cm) above the umbilicus. (c) The reference point for diastasis of rectus abdominus muscles measurement is three fingerbreadths (4.5 cm) below the umbilicus.

insertion at the xiphoid process, and then cut the corners at the tape ends into a rounded form. The base is affixed to the origin in resting, with very light to light tension (15–25% of available tension) over the right and left rectus abdominis bellies up to the insertion at xiphoid process.

When the tail of the tape was approximately 1-2 inches from the end, the end of the tape was adhered down without tension. Then the applied tape strip was rubbed to initiate glue adhesion with the muscle in its current stretched position [13] (Fig. 2a).

After affixing the first pair of tape strips, a second pair of KT of about 25-cm length, was applied at an angle of 90° to the first KT pair, 4.5 cm above and below the umbilicus centered on the site of rectus diastasis and parallel to the waistline.

The second pair of KT was measured, had its corners cut into a rounded form, and by splitting the backing paper down the middle and removing up to the required width of the tape ends, the tape was affixed with maximum stretch, and both ends were attached to the skin without stretching (Fig. 2b).

For the easy removal of the tape, the tape was moistened, removed from the top down, lifting the tape from the skin, applying tension between the skin and the tape, and then pushed the skin away from the tape [13].

Statistical analysis

All statistical calculations were done using computer programs SPSS (statistical package for social sciences; SPSS Inc., Chicago, Illinois, USA) and the statistical significance at a confidence of 95% (α -level of 0.05).

RESULTS

The data regarding gynecological history of the studied group represented are in Table 1.

The post-treatment results of this study has shown a gradual reduction in minimum WC, WC, and widest WC before starting the study, after every KT setting (1 KT, 2 KT, 3 KT) and after study (Fig. 3).

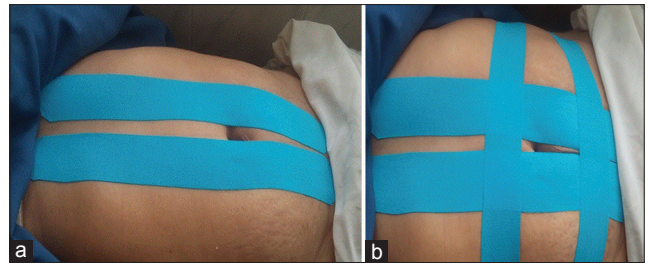


Figure 2: Application of Kinesio taping. (a) First pair of Kinesio taping strips applied over the right and left recti from origin up to the insertion at the xiphoid process. (b) Second pair of Kinesio taping applied 4.5 cm above and below the umbilicus centered on the site of diastasis of rectus abdominus muscles.

Table 1: The gynecological history of the studied group

Variables	n (%)
Parity	
Primiparous	3 (11.53)
Multiparous	23 (88.47)
Last delivery	
Vaginal	11 (42.3)
Cesarean section	15 (57.7)
DRAM	
Present	18 (69.23)
Absent	8 (30.77)

DRAM, diastasis of rectus abdominus muscles.

Comparing the results among the studied groups regarding the total difference in waist measurements before starting the study and after the end of the study showed a statistically highly significant decrease ($P < 0.001$) in minimum WC, WC, and widest WC measurements (Table 2).

Comparing the results of the studied group showed a statistically highly significant decrease ($P < 0.001$) in minimum WC, WC, and widest WC measurements before starting the study and after the end of the study in women with DRAM (5.388 ± 2.061 , 6.111 ± 3.197 , 5.333 ± 1.815 , respectively), than those in women without DRAM (3.625 ± 2.263 , 3.625 ± 1.407 , 2.875 ± 1.807 , respectively) (Fig. 4).

Also, the results of this study showed a statistically highly significant decrease ($P < 0.001$) in minimum WC, WC, and widest WC measurements before starting the study and after the end of the study in women who had spontaneous vaginal delivery (5.272 ± 2.493 , 6.272 ± 3.165 , 4.454 ± 2.381 , respectively), than those had cesarean section in the last delivery (4.533 ± 2.065 , 4.666 ± 2.743 , 4.666 ± 1.988 , respectively) (Fig. 5).

Moreover, the results of this study showed a statistically highly significant decrease ($P < 0.001$) in minimum WC, WC, and widest WC measurements in all women before starting the study and after the end of the study with better decrease (5.142 ± 1.875 , 6.142 ± 3.324 , 4.928 ± 2.055 , respectively), in women aged less than 30 years than women

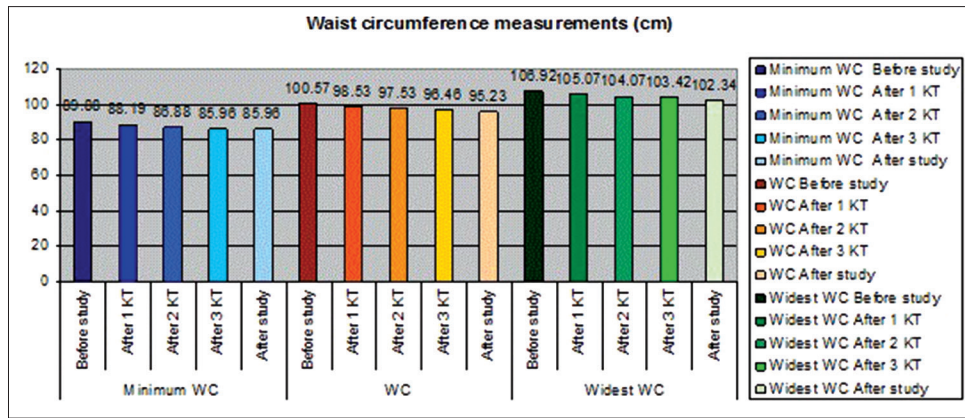


Figure 3: Mean ± SD of the studied group regarding minimum waist circumference (WC), WC, and widest WC before and after Kinesio taping application.

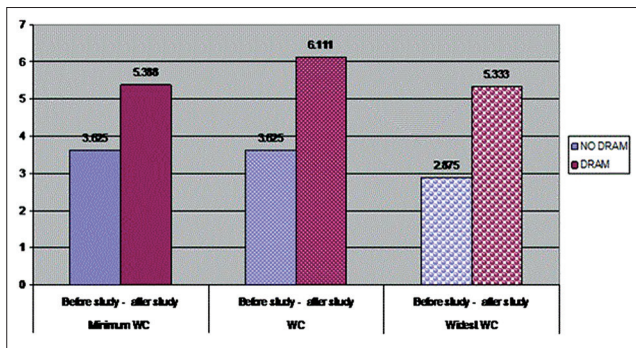


Figure 4: The total differences in minimum waist circumference (WC), WC, and widest WC measurements before starting the study and after the end of the study in the studied group regarding the presence or absence of diastasis of rectus abdominus muscles.

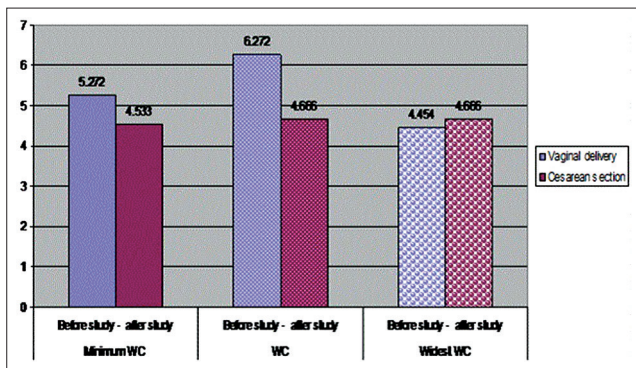


Figure 5: The total differences in minimum waist circumference (WC), WC, and widest WC measurements before starting the study and after the end of the study in the studied group regarding the type of last delivery.

aged greater than or equal to 30 years (4.500 ± 2.645 , 4.416 ± 2.314 , 4.166 ± 2.208 , respectively) (Fig. 6).

DISCUSSION

This study was designed to examine the efficacy of KT in reducing WCs in postpartum women with or without DRAM.

Results of this study

About 69.23% of cases had DRAM, 61.5% of them were multiparous, 38.46% of them had cesarean section as a

Table 2: The total differences in waist circumferences among the studied group before and after the end of the study

Variables	Paired difference		
	Mean ± SD	t	P
Minimum WC			
Before study - after study	4.846±2.239	11.034	<0.001
WC			
Before study - after study	5.346±2.979	9.150	<0.001
Widest WC			
Before study - after study	4.576±2.119	11.009	<0.001

WC, waist circumference.

previous delivery, 38.4% of them was less than 30 years, and 30.76% women were greater than or equal to 30 years.

The results of the current study are in agreement with Rath *et al.* [14], Lo *et al.* [15] and Artal *et al.* [16] who listed the risk factors to development of DRAM: increased age of the mother, greater weight gain with pregnancy, carrying multiples, and multiple births.

Also, the results of the current study are in agreement with those demonstrated by Boissonnault and Blaschak [17] and Barbosa *et al.* [18] as women undergoing cesarean delivery had higher levels of DRAM compared with those who had vaginal delivery due to the possible change in anatomical morphology of the abdominal wall after a cesarean section.

Post-treatment results of the studied group showed a statistically highly significant decrease ($P < 0.001$) in minimum WC, WC, and widest WC measurements before starting the study and after the end of the study in women with DRAM than those in women without DRAM.

The reasons for improvement in this study may be related to the physiological mechanisms by which KT is presumed to have a therapeutic benefit: (a) gather fascia to align the tissue in its desired position, (b) increased proprioception through increased stimulation of the mechanoreceptors to stimulate movement, and (c) provide a positional stimulus to the skin [13,19-21].

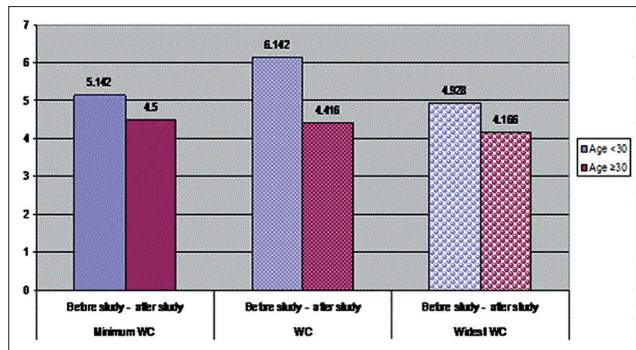


Figure 6: The total difference in minimum waist circumference (WC), WC, and widest WC measurements before starting the study and after the end of the study regarding women's age.

Moreover, KT has been theorized to lift the skin from the underlying fascia, increasing blood and lymphatic flow, which might result in increased oxygen allotment to the muscle, and improved anaerobic muscle function [19,22-25].

More to the point, it is proposed that applying KT from the muscle origin to insertion will produce a concentric pull on the fascia as well as activation of alpha-motor neuron in skeletal muscles under the skin, which leads to continuous muscle contraction [26-28].

Another mechanism of muscle strengthening of taping therapy is the irradiation phenomenon, as taping therapy improves the intensity and frequency of stimulation to the muscles, resulting in the increase of contraction force [29,30].

The results of this study are supported by Marcin *et al.* [31] who reported faster reduction in abdominal circumference in postcholecystectomy patients who received KT.

However, some studies have reported contradictory results. Chen *et al.* [32], Cools *et al.* [33], and Fu *et al.* [34] reported that taping of the skin had no effect on the excitability of the muscles of healthy persons.

While, Morrissey [35] postulated that application of tape to an underactive muscle reduces the length of the muscle and thus moves the length-tension curve toward the left while resting.

Also, Alexander *et al.* [36] argued that the excitability of motor neurons decreases with taping in the direction of the muscle fiber.

However, Tobin and Robinson [37] reported that taping the muscle in a crossing pattern results in a noticeable reduction in muscle activity.

CONCLUSION

The results of this study testified that KT is an effective method in reducing abdominal circumferences in postpartum women with or without DRAM.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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