

## ORIGINAL ARTICLE

## Are the Kinesio Tape colors effective for patient perception? A randomized single blind trial

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**Purpose:** Colors may affect the human body as a bio-psycho-social being in treatment. The purpose of this study was to determine the effects of Kinesio Tape colors for patient perception in patients with tight trapezius muscle.

**Methods:** Fifty female patients (mean age was 20.84±1.81 years, mean body mass index was 21.19±3.1 kg/m<sup>2</sup>) with tight trapezius were enrolled in this randomized single blind trial. The order of application for Kinesio Tape colors were randomly selected for each subject before the study began. Five different (red, blue, black, beige, white) colors were applied to subjects' dominant side tight trapezius muscle with using Kinesio Taping muscle inhibition technique. Subjects' were asked how they feel after each color of taping (none, warm, cool, powerful, fresh etc.). Patient Global Impression of Change was used for evaluation of patient perception.

**Results:** Subjects' percentages of feelings were for red tape; 30% none, 26% warm, for blue tape; 32% warm, %24 none, for black tape; 24% none, 22% warm, for beige tape; 26% warm, 20% none, for white tape; 34% warm, 20% none. Our results showed that there was no difference in patient perception for all type of Kinesio Tape colors (p>0.05).

**Conclusion:** As a result, the color of treating tape may affect the feelings of subjects. But there was no difference between colors in tight trapezius muscle. Patient satisfaction and admiration should be considered in order to enhance the effect of treatment.

**Keywords:** Kinesio Taping, Color perception, Color therapy.

### Kinesio Tape renkleri hasta algısını etkiler mi? Randomize tek kör çalışma

**Amaç:** Tedavide renkler biyopsikososyal varlık olan insan vücudunu etkileyebilir. Bu çalışmanın amacı trapez kas gerginliği olan hastalarda Kinesio Tape renklerinin hasta algısına etkisini belirlemektir.

**Yöntem:** Randomize tek kör çalışmaya trapez gerginliği olan elli kadın birey (ortalama yaş: 20,84±1,81 yıl, ortalama vücut kitle indeksi: 21,19±3,1 kg/m<sup>2</sup>) alındı. Çalışmaya başlamadan önce her bir birey için Kinesio Tape renklerinin uygulama sırası rastgele seçildi. Bireylerin dominant taraf gergin trapez kasına beş farklı (kırmızı, mavi, siyah, bej, beyaz) renk Kinesio Taping inhibisyon tekniği ile uygulandı. Her bir renk bantlama uygulamasından sonra bireylere nasıl hissettikleri (hiç bir şey, ılık, soğuk, güçlü, ferah, vs) soruldu. Hasta algısını değerlendirmek için *Patient Global Impression of Change* (PGIC) anketi kullanıldı.

**Bulgular:** Bireylerin hissettikleri, kırmızı bant için: % 30 hiç bir şey, % 26 ılık, mavi bant için: % 32 ılık, % 24 hiçbir şey, siyah bant için: % 24 hiçbir şey, % 22 ılık, bej bant için: % 26 ılık, % 20 hiçbir şey, beyaz bant için: % 34 ılık, % 20 hiçbir şey idi. Sonuçlarımız, tüm Kinesio Tape renklerinin hasta algısında fark yaratmadığını gösterdi (p>0.05).

**Sonuç:** Sonuç olarak, tedavide kullanılan bantların renkleri bireylerin hislerini etkileyebilmektedir. Fakat trapez gerginliğinde renklerin farkı bulunmamaktadır. Tedavinin etkisini arttırmak için hasta memnuniyeti ve beğenisi göz önüne alınmalıdır.

**Anahtar kelimeler:** Kinesio Taping, Renk algısı, Renk tedavisi.

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Color plays a major role in setting up a particular mood or state of mind which affects feelings, moods, emotions and way of perception. Colors are used in all area of life like clothing, decor, and food, visualize and etc. to help balance and affect body, mind and emotions.

Treatment of diseases by colors has been used by different effects on body and mind as a supportive therapy along with other methods. In regard to color healing, it is suggested that color can be used as a treatment tool and as called "chromotherapy or "color therapy". It's one of the alternative treatment methods using the color property of the visible light to cure diseases via physical, emotional, spiritual, or mental status.<sup>1,2</sup> It is often believed that red is a physically stimulating and arousing color and blue is a calming, relaxing and healing.<sup>3</sup> Also blue color is found to be an improving factor for cognitive performance.<sup>4</sup>

Regarding the color-chakra theory; red activates the circulation system and benefits the five senses, blue raises metabolism and is used to stabilize the heart, muscles and bloodstream and green strengthens bones and muscles, disinfects bacteria and virus, and relieves tension.<sup>5</sup> Also a color psychology state that red is a color for courage, strength, anger, violence and brutality, but blue is calming, relaxing and healing.<sup>4</sup>

In addition to all, some researchers showed that in visible range, specific wavelengths have different catalytic effects on different enzymatic activity. Purple color (464 nm) causes enhanced activity in the glucose oxidation, hence purple color light is used as chromo therapeutic treatment for diabetes.<sup>1,6</sup>

There are numerous reasons defined for patients' having tight trapezius muscle. These reasons could be general health and emotional health problems but tight trapezius muscle is very common problems that work at desk or computer, especially at people who have poor posture and who work in an area that is not ergonomically designed. Different applications such as thermotherapy, electrotherapy, acupuncture, Kinesio Taping and exercise may help to release muscle tightness and decrease pain.<sup>7-10</sup> Nowadays Kinesio Taping is one of the popular treatment methods for muscle pathologies. It can help the practitioner to inhibit or facilitate the muscle according to

direction of tape application. Also it increases the local circulation and decreases pain. Kinesio Tape (KT) is in red, blue, black, white and neutral colors. The red is a darker color on the light spectrum and absorb more light, slightly increasing the temperature under the KT strip. The blue is a lighter color on the light spectrum and reflect more light, slightly decreasing the temperature under the KT strip. There are no differences in the manufacture of the tape except the change in the dye color required for a color difference.<sup>11</sup>

Colors and their intensity may affect human body as a bio-psycho-social being, and these effects may vary depending on age, gender, culture and preference.<sup>12,13</sup> Unfortunately there is no evidence on the effectiveness of different KT colors on patient perception in the literature. Therefore the purpose of this study was to determine the effects of KT colors for patient perception in subjects with tight trapezius muscle.

## METHODS

### Subjects

Fifty female subjects (mean age: 20.84±1.81 years, body mass index: 21.19±3.10 kg/m<sup>2</sup>) with tight trapezius muscle were included in the study. Tightness in trapezius muscle was diagnosed with the palpation of trigger point on center of the upper trapezius muscle by experienced physiotherapist. Diagnosis depended on accurate palpation with 2-4 kg/cm<sup>2</sup> of pressure for 10 to 20 seconds over center of the upper trapezius muscle to allow the pain to develop. Also the subjects were asked if they feel pain and tightness on their upper trapezius region. Exclusion criteria for this study were if subject; a) had orthopedic problems affecting upper extremity or neck, b) had cardiac problems, c) had an allergy such as adhesive tape or etc.) had upper extremity or cervical surgery.

### Procedure

The power analysis indicated that 50 subjects for each group were needed with 80% power and a 5% type 1 error. The power analysis of our study showed a power of 80% with Patient Global Impression of Change (PGIC) as the primary outcome.

Before the study began the randomization

procedure was performed using an online random allocation software program ([www.graphpad.com](http://www.graphpad.com) [20-01-2014, 12:47:35]) by independent physiotherapist (PT) randomizing five intervention orders for all KT colors for 50 subjects. As an example; for one of the subjects' intervention order was red, blue, black, neutral and white, for another subjects' intervention order was black, neutral, white, red and blue.

Before the interventions, to create a single blind research design, one experienced PT was designated as the evaluator PT. A second certified Kinesio Taping instructor PT was designated as the applying PT. Evaluator PT was blinded to the interventions but patients were not blinded to the colors of KT. Blinding procedure for evaluator PT was to put jacket on and cover the KT with their hair. All colors of KT (red, blue, black, neutral and white) were applied to all subjects consecutively by the applying PT. A minute of rest was given between each tape intervention. Total intervention duration was completed in ten minutes to prevent treatment effect of tape for each subject. Also each subject was evaluated in same room and at temperature within 24°C.

KT was applied to subjects' dominant side at the position of internal rotation at their ipsilateral shoulder and hand behind their back in sitting position. Then in order to stretch upper trapezius muscle, subjects were positioned at neck lateral flexion to contralateral side and rotation to ipsilateral side. Kinesio Taping muscle inhibition technique application was used for each tape on upper trapezius muscle. This technique was applied for tight trapezius muscle and the tape was applied from insertion to origin to inhibit muscle function. The tension of the tape was very light and about 15-25% of available tension of the tape (Figure 1).<sup>11</sup>

#### Outcome measurements

The data related to the descriptive and clinic characteristics of the subjects were collected at the beginning of the study. Subjects' perception was used as primary, and subjects' feelings were used as secondary outcome measurements.

The PGIC Questionnaire was used for subjects' perception to the color of tape. Subjects marked if they have any change in their perceived tightness in their tight trapezius muscle after each color of taping

application. The PGIC score allows the subject to assess their own improvement or worsening on tightness and other symptoms, physical or emotional functioning, and side effects, and it can be used to evaluate the clinical significance of the treatment effect.<sup>14</sup> It allows the practitioner to assess the perceived level of recovery in subjects. The effect of perceived treatment is measured by seven point Likert scale with the following categories: '0' no change (or condition has got worse), '1' almost the same, hardly any change at all, '2' a little better, but no noticeable change, '3' somewhat better, but the change has not made any real difference '4' moderately better and a slight but noticeable change, '5' better and a definite improvement that has made a real and worthwhile difference, '6' a great deal better, and considerable improvement that has made all the difference.<sup>15</sup>

Subjects' feelings were assessed with multiple choice questions. Subjects were asked how they feel after each color of taping application. Answers include; none, warm, cool, strength, fresh and other. If subjects marked other, evaluator PT was asked to indicate their feeling.

#### Statistical analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) software version 17.0. The variables were non-normally distributed and ordinal. Frequencies were calculated for descriptive and clinical characteristics of subjects. Friedman tests were conducted to test whether there is significant change in the subjects' perception and feelings by colors. An overall 5% type-1 error level was used to infer statistical significance.

## RESULTS

Fifty female subjects (mean age: 20.84±1.81 years, mean body mass index: 21.19±3.10 kg/m<sup>2</sup>) with tight trapezius enrolled to this study. 92% of the subjects had dominancy at right side and 8% of the subjects had dominancy at left side. There was no significant change in the subjects' perception and feelings by KT colors ( $p>0.05$ ). A summary of the subjects' perception and feelings presented in Table 1 and 2, respectively.

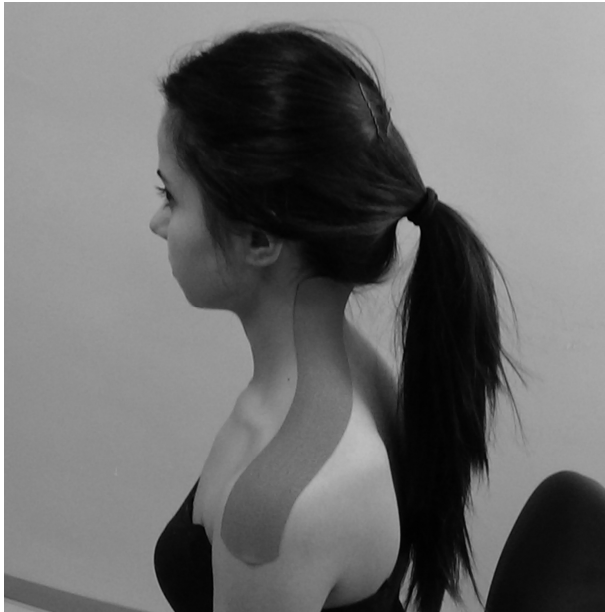


Figure 1. Application of Kinesio Tape.

## DISCUSSION

In this study we investigated the effects of KT colors for patient perception in subjects with tight trapezius muscle. We found that the feelings of subjects differ for the color of treating tape but there is no difference in patient perception among tape colors in patients with tight trapezius muscle. Patient satisfaction and admiration to different colors should be considered in order to enhance the effect of treatment.

Human, as a biopsychosocial being, biological, psychological and social features coexist. Therefore; clinicians could attend simultaneously to the biological, psychological, and social dimensions of disorders or diseases in a holistic way.<sup>16</sup> The absence of hand touch and affection of therapists causes emotional damage; it alters the balance of the autonomic and limbic systems. In our study, feelings of subjects had difference in different colors of tape as feeling nothing or warm are the most preferred answers.

Some studies indicated that gender differences with respect to tactile sensibility: women are much more responsive to tactile stimulation.<sup>17</sup> According to our results; there was no statistically significant difference found in subjects' perception and feelings. While

majority of subjects felt nothing, others felt warm, strength, refreshing and cold. To our knowledge KT materials have no differences in the manufacture of the tape and at least 30 minutes are required to make treating effect.<sup>11</sup>

Cultural differences are also important in patient perception and effectiveness of treatment.<sup>18</sup> Many individuals believe that blue is universally the best color as it has the most positive and fewest negative cultural associations across various cultures. Studies have shown most colors have more positive than negative associations and even when a color has negative association; it is normally only when used in a particular context. According to some researchers, people in a number of cultures have an automatic negative perception of the color black. In Ireland, India, Turkey, and Mexico, the red hand shielded families from harm and in Jerusalem a blue hand was painted on walls and dwellings.<sup>5</sup> Patient perception to different colors of KT is found mostly related to warm feeling or feeling of nothing. This may be because of patients' Mediterranean-type human characteristics. Japanese, Arabs and Mediterranean cultures, who have extensive information networks among family, friends, colleagues and clients and who are involved in close personal relations are high context.<sup>19</sup>

Color is detected by the eye and the brain; however, nervous system impulses of the color do not only go to the brain, but also some impulses travel to the pituitary and pineal glands through the hypothalamus and subject may be able to assume that colors affect other systems of the body as well. Color consultants claim in western cultures the psychological and physiological effects of hues in the red area of color are typically viewed as "warm," while those in the blue and green range are typically viewed as "cool".<sup>18</sup> On the contrary, as we investigated the effects of different colors of KT on patient perception, we found that there were no differences between colors. Colors and their effects on perception may not be all about chromotherapy theories, but may also be about different qualities of people and environment. Additionally to these, KT materials have no differences in the manufacture of the tape except the change in the dye color required for a color difference.<sup>11</sup> This also supports our results of finding no difference between colors.

Table 1. Percentages of patient perception and differences for Kinesio Tape colors in subjects with tight trapezius muscle.

PGIC Questionnaire	Red n (%)	Blue n (%)	Black n (%)	Beige n (%)	White n (%)	p*
No change	15 (30)	14 (28)	7 (14)	11 (22)	13 (26)	0.271
A	11 (22)	7 (14)	12 (24)	8 (16)	10 (20)	
B	6 (12)	8 (16)	10 (20)	8 (16)	7 (14)	
C	7 (14)	6 (12)	7 (14)	8 (16)	6 (12)	
D	10 (20)	11 (22)	11 (22)	11 (22)	9 (18)	
E	- (0)	3 (6)	2 (4)	2 (4)	4 (8)	
F	1 (2)	1 (2)	1 (2)	2 (4)	1 (2)	

\*p value for Friedman analysis. PGIC: Patient Global Impression of Change. A: Almost the same, hardly any change at all. B: A little better, but no noticeable change. C: Somewhat better, but the change has not made any real difference. D: Moderately better and slight but noticeable change. E: Better and definite improvement that has made a real and worthwhile difference. F: A great deal better, and considerable improvement that has made all the difference.

Table 2. Percentages of subjects' feelings in tight trapezius muscle.

Subjects' feelings	Red n (%)	Blue n (%)	Black n (%)	Beige n (%)	White n (%)
Nothing	15 (30)	12 (24)	12 (24)	10 (20)	10 (20)
Warm	13 (26)	16 (32)	11 (22)	13 (26)	17 (34)
Cold	3 (6)	5 (10)	5 (10)	7 (14)	2 (4)
Strength	7 (14)	8 (16)	6 (12)	6 (12)	8 (16)
Refreshing	9 (18)	1 (2)	5 (10)	7 (14)	8 (16)
Tightness	2 (4)	3 (6)	3 (6)	2 (4)	2 (4)
Other (Pricking)	1 (2)	-	3 (6)	1 (2)	-
Other (Relief)	-	1 (2)	-	-	-
Other (Warm and itchy)	-	1 (2)	-	1 (2)	1 (2)
Other (Burning)	-	1 (2)	2 (4)	-	-
Other (Burning and tightness)	-	1 (2)	1 (2)	1 (2)	-
Other (Burning and refreshing)	-	1 (2)	-	-	-
Other (Sweating)	-	-	1 (2)	1 (2)	-
Other (Strength and refreshing)	-	-	1 (2)	-	-
Other (Warm and pressure)	-	-	-	1 (2)	1 (2)
Other (Warm and strength)	-	-	-	-	1 (2)

### Study limitations

One of limitation of our study is that all female subjects recruited to our study. Because of this, we can speculate that different hormonal levels may have negative effect in understanding patient perception. Another limitation of the study there is no Turkish validity for PGIC Questionnaire. Also objective diagnostic procedures for trapezius muscle palpation could be used in future studies. Further studies need to do a new research by adding to male participants.

### Conclusion

As a conclusion to our results and based on our experience, it is best way to ask the patient which color of tape to use for treatment and

suggest patient based treatment approach. This could help the therapist to do a more effective treatment and makes the patient more comfortable about the treatment. Patient-centered treatment approaches may be more effective in healing process of the patients.

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