

Original Research

# Kinesiology Tape: A Descriptive Survey of Healthcare Professionals in the United States

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### Background

The existing body of kinesiology tape (KT) research reveals inconsistent results which challenges the efficacy of the intervention. Understanding professional beliefs and KT clinical application might provide insight for future research and development of evidence-based guidelines.

### Purpose

The purpose of this study was to survey and document the beliefs and clinical application methods of KT among healthcare professionals in the United States.

### Design

Cross-sectional survey study.

### Methods

A 30-question online survey was emailed to members of the National Athletic Trainers Association, Academy of Orthopedic Physical Therapy, and American Academy of Sports Physical Therapy. Professionals were also informed through a recruitment post in different private healthcare Facebook groups.

### Results

One thousand and eighty-three respondents completed the survey. Most respondents used KT for post-injury treatment (74%), pain modulation (67%), and neuro-sensory feedback (60%). Most believed that KT stimulates skin mechanoreceptors (77%), improve local circulation (69%), and modulates pain (60%). Some respondents believed KT only created a placebo effect (40%) and use it for such therapeutic purposes (58%). Most used a standard uncut roll (67%) in black (71%) or beige (66%). Most respondents did not use any specialty pre-cut tape (83%), infused tape (99.54%), or a topical analgesic with tape (65%). The most common tape tension lengths used by respondents were 50% tension (47%) and 25% (25%) tension. Patient reported outcomes (80%) were the most common clinical measures. Most respondents provided skin prep (64%) and tape removal (77%) instructions. Some did not provide any skin prep (36%) or tape removal (23%) instruction. The average recommended times to wear KT were two to three days (60%). The maximum times ranged from two to five days (81%).

### Conclusion

This survey provides insight into how professionals use KT and highlights the gap between research and practice. Future research should address these gaps to better determine evidence-based guidelines.

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## Level of Evidence

3

### INTRODUCTION

Dr. Kenso Kase introduced kinesiology tape (KT) in the 1970s and healthcare professionals have since made it a popular intervention across different rehabilitation, fitness, and sports settings.<sup>1</sup> The tape is made of a cotton-base, with elastic properties and adhesive which allows it to be applied directly to the skin. KT is available in different sizes, widths, material, lengths (e.g. precut, rolls), and textures. Currently, numerous manufacturers, such as KT Tape®, Kinesio Tape®, and TheraBand® Kinesiology Tape, produce various types of tape to meet different therapeutic needs such as: sports, edema control, and neurosensory effects. Some manufacturers have expanded beyond tape production and provide professional continuing education and certification to practitioners who want to utilize KT in clinical practice.

Despite the popularity, the research regarding KT therapeutic benefits is inconclusive with many studies reporting inconsistent outcomes.<sup>2</sup> Since 2010, approximately thirty-eight KT systematic reviews have been published appraising the efficacy for specific conditions. The reviews found inconclusive evidence for shoulder,<sup>3,4</sup> knee,<sup>5</sup> and elbow disorders,<sup>6</sup> as well as spinal pain,<sup>7</sup> proprioception,<sup>8</sup> brachial plexus injury in children,<sup>9</sup> muscle strength,<sup>10</sup> and sports performance.<sup>11</sup> Researchers also appraised the KT literature on musculoskeletal conditions,<sup>2,12-15</sup> chronic musculoskeletal pain,<sup>16,17</sup> sports injuries,<sup>18</sup> in eight systematic reviews and found inconclusive results. Weak to moderate evidence was found supporting the efficacy of KT for post-mastectomy lymphedema,<sup>19</sup> children with Cerebral Palsy,<sup>20-22</sup> stroke patients,<sup>23-26</sup> ankle function,<sup>27</sup> athletic performance,<sup>28,29</sup> myofascial pain,<sup>30</sup> and as an adjunct therapy for shoulder impingement,<sup>31</sup> lumbosacral pain,<sup>17,32-37</sup> and patellofemoral pain.<sup>38</sup>

The variable KT research has left many unanswered questions regarding therapeutic efficacy, which is exacerbated by variations in KT application and use, as well as a lack of translation from the research to practice. Currently, little is known regarding the training and practice patterns of professionals who utilize KT and how practice patterns correspond to application methods used in KT research. Professionals may disregard the weak body of KT evidence given individual practice experiences with the technique. Further, evidence-based practice recommendations for application are lacking and clinicians may use their own preferred methods of administering the intervention. Variations from practice to research, or across groups of clinicians with varied training, may result in inconsistencies and limit the ability to create best practice consensus or optimal guidelines for practice and research. Thus, there is a need to survey and document the KT beliefs, training, and clinical practices of healthcare professionals to understand how KT is used for patient care. To our knowledge, KT surveys examining practice patterns, perceptions, and training of professionals utilizing the technique have not been published. Obtaining such information may help guide future

studies and the development of evidence-based guidelines. The purpose of this study was to survey and document the beliefs and clinical practices of KT among healthcare professionals in the United States.

### METHODS

#### STUDY TYPE AND PARTICIPANTS

This cross-sectional survey study was approved by the Institutional Review Board at California State University Dominguez Hills (# 20-115). Healthcare professionals were recruited via convenience sampling between March to May 2020. Emails were sent to a random sample of members from the National Athletic Trainers Association (N=3,000) and all members of the Academy of Orthopedic Physical Therapy (N=17,811) and American Academy of Sports Physical Therapy (N=6,597). This sampling technique has been used in prior myofascial intervention survey research.<sup>39,40</sup> Healthcare professionals (N=21,775) were also informed through a recruitment post in different private healthcare Facebook groups. Prior research has documented that Facebook is an effective recruitment tool for healthcare research purposes.<sup>41</sup>

#### SURVEY DESIGN

The online survey (SurveyMonkey® [www.surveymonkey.com](http://www.surveymonkey.com)) included one respondent consent question and 29 questions that represented seven distinct areas: 1) respondent demographics, 2) clinical perceptions about KT, 3) clinical application of standard, specialty, infused KT, topicals, and clinical measures, and 4) KT education, and referral.

The focus of respondent demographic questions was to document participant age, credentials, practice setting/s, and professional experience. The goal of clinical perceptions about KT questions were to document professional beliefs about the use of the tape with clients, KT therapeutic effects, and physiological mechanisms. Also, to document respondent beliefs about KT precautions and contraindications. The focus of the clinic application of KT questions were to document how professionals use different KT tapes, topicals, and clinical measures in their practice. Practice patterns were further assessed by documenting how professionals approached KT education such as skin prep, tape removal, length of time to wear KT, patient education, and referral.

After initial survey development was completed, the first survey draft underwent two rounds of pilot testing with four independent athletic training and physical therapy professionals to establish face validity. Based upon reviewer feedback, revisions were made, and a final set of survey items was identified.<sup>39,40</sup> The final survey was further tested for readability using the Flesch reading-ease test and Flesch-Kincaid grade level test. The 30 questions in the final survey scored 53.2 on the Flesch Ease of Reading Test and 7.0 on the Flesch-Kincaid Grade level test, which indicated the

English used in the survey was fairly easy to read at the 7<sup>th</sup> grade level.<sup>42</sup> These methods have been used in prior myofascial intervention survey research.<sup>39,40,43</sup>

## DATA ANALYSIS

Data were downloaded from SurveyMonkey for analysis. Statistical analysis was performed using SPSS version 25.0 (IBM SPSS, Armonk, NY, USA). Descriptive data including total responses, frequency count, and percentages were calculated. Data were treated conservatively, any respondent who failed to answer an item was removed from the data set.

## RESULTS

A total of 51,000 healthcare professionals were recruited. A total of 1,535 professionals began the survey. Incomplete surveys were eliminated from the data synthesis. A total of 1083 respondents finished the survey resulting in a 2.1% completion rate (1,083/51,000).

This section details most respondent answers for questions within the seven distinct survey areas using rounded values for ease of interpretation. A more detailed description of respondent answers can be found in [Tables 1-7](#).

### RESPONDENT DEMOGRAPHICS

Forty-five percent (n=492) of respondents were men and 54% (n=584) were women. Sixty-one percent (n=657) reported being a physical therapist, 30% (n=325) a certified athletic trainer, 4% (n=44) a physical therapist assistant, 2% (n=19) a chiropractor, 1% (n=10) a massage therapist, and 2% reported being a member of another profession. A substantial proportion of respondents reported working in a private outpatient facility (42%, n=152), hospital based facility (18%, n=197), university sports medicine or athletic training facility (12%, n=131), and secondary school setting (11%, n=125). The reported average years in practice was approximately 16 years ([Table 1](#)).

Respondent also indicated several factors that influenced how KT was applied in their clinical practice. The most common influential factors were collaboration with other professionals (75%, n=812), continuing education courses or conferences (74%, n=805), prior empirical experience (64%, n=694), and peer review research and textbooks (53%, n=580). Respondents also reported relying on websites, social media, and YouTube (31%, n=338) and manufacturer instructions (29%, n=313) to inform their clinical application of KT ([Table 2](#)).

Several potential therapeutic effects of KT were also reported by the respondents. Most respondents believed KT modulates pain (70%, n=756), enhances proprioception and kinesthetic sense (69%, n=748), and increases local circulation (65%, n=709), while a smaller portion reported believing KT enhances myofascial mobility (29%, n=319). A substantial percentage (58%, n=635) of respondents also indicated a belief that KT creates a placebo effect ([Table 2](#)).

The reported potential physiological mechanisms that occur with KT application are reported in [Table 2](#). Most respondents believed that KT stimulates skin mechanorecep-

tors increasing proprioception (77%, n=834), lifts the skin to improve local circulation (69%, n=749), stimulates skin nociceptors resulting in pain modulation (60%, n=652), and creates a placebo effect (74%; n=798). Others indicated that KT application improves muscle activation and motor control (46%, n=501) and inhibits muscle activation (32%, n=345) when used in patient care ([Table 2](#)).

Most respondents believed their preferred tension length created a therapeutic effect by enhancing proprioception and kinesthetic sense (59%, n=636), modulating pain (55%, n=599), increasing local circulation (43%, n=469), and enhancing myofascial mobility (23%, n=254). Forty-four percent (n=475) of respondents believed their preferred tension length provided a placebo effect ([Table 2](#)).

A large portion of respondents (51%, n=549) considered skin irritation and itching as precautions. Twenty-five percent (n=276) also considered thin skin as a precaution followed by impaired or altered sensation (9%, n=87). Ninety-five percent (n=1028) of respondents reported no other precautions to consider beyond the ones listed in the survey ([Table 2](#)).

Regarding KT contraindications, thirty-three percent (n=361) of respondents considered skin allergies (e.g. adhesives, latex) and 33% (n=356) considered open wounds and lesions as contraindications. Thirteen percent (n=146) considered inability to communicate as a contraindication followed by deep vein thrombosis (5%, n=52), undiagnosed rash or skin irritation (4%, n=40), malignancy (active) (3%, n=38), and diabetes (2%, n=26). Eighty-five percent (n=918) of respondents reported no other contraindications to consider beyond the ones listed in the survey ([Table 2](#)).

### CLINICAL APPLICATION OF STANDARD KT, INFUSED KT, TOPICALS, AND CLINICAL MEASURES

Respondents reported utilizing a variety of tape brands and styles in clinical practice ([Table 3](#)). For commercial brand KT, KT Tape® (59%, n=640), RockTape® (50% n=546), Kinesio® tape (33%, n=359), and TheraBand® tape (11%, n=116) were the most commonly reported types of tape used by respondents. The respondents also indicated using a variety of tape colors, with black (71%, n=774) and beige (66%, n=713) being the most common colors used ([Table 3](#)).

Most respondents reported using the KT standard uncut roll (2in/5cm x16.4ft/5m) (67%, n=724), while the large standard uncut roll (36%, n=389), standard pre-cut strips (15% n=168), and the wide uncut roll (11%, n=114) were also commonly used by clinicians ([Table 3](#)). Only a small portion of respondents reported using the pre-cut fan tape (9%, n=96), pre-cut tape for the lower body (4%, n=43), or pre-cut tape for the upper body (3% n=38); most of the respondents (83%, n=902) reported not using any of the specialty pre-cut tape options available ([Table 3](#)).

When applying KT to clients, the most common tension length used by respondents was 50% (47%, n=510) followed by 25% (25%, n=268) and 75% (18%, n=199) tension; seven percent (n=71) of respondents reported using no tension length ([Table 3](#)).

Almost all the respondents indicated the commercially manufactured infused tapes (99.54%, n=1078) were not used in their clinical practice ([Table 4](#)). Similarly, most re-

**Table 1: Respondent demographics (Total N=1083)**

Please describe your gender.	Frequency % (N)
Male	45.43% (492)
Female	53.92% (584)
Other	0.18% (002)
Prefer not to answer	0.47% (005)
<b>Please choose your profession.</b>	
Physical Therapist	60.66% (657)
Chiropractor	01.75% (19)
Certified Athletic Trainer	30.00% (325)
Occupational Therapist	0.28% (3)
Acupuncturist	0.00% (0)
Physical Therapist Assistant	4.09% (44)
Occupational Therapist Assistant	0.09% (1)
Massage Therapist	0.92% (10)
Certified Personal Trainer	0.28% (3)
Kinesiotherapist	0.09% (1)
Exercise Physiologist	0.18% (2)
Educator (secondary schools, collegiate)	0.28% (3)
Physician Assistant	0.18% (2)
Medical Doctor, Podiatrist, Doctor of Osteopathy	0.28% (3)
Other profession not listed	0.92% (10)
<b>Please choose your primary practice setting.</b>	
Private outpatient facility	42.10% (456)
Public outpatient facility (e.g. state, county)	1.48% (16)
Hospital based facility	18.19% (197)
University/college sports medicine or athletic training facility	12.09% (131)
Secondary school athletic training facility	11.54% (125)
Academic/research institution	2.22% (24)
Fitness or wellness facility	1.01% (11)
Massage therapy facility	0.28% (3)
Military service facility	1.48% (16)
In-home services	1.57% (17)
Professional sports	2.59% (28)
Skilled nursing facility/acute facility	0.74% (8)
Industrial/occupational health services	1.94% (21)
Other setting not listed	2.77% (30)
<b>How many years have you been in professional practice?</b>	
Average years in professional practice	16.13 ±11.11 years

spondents (65%, n=704) also indicated not using any topical analgesic in combination with a non-infused KT. The most commonly utilized topical analgesics, however, were Biofreeze® (23%, n=255), RockTape RockSauce® Fire (9%, n=98), RockTape RockSauce® Ice (7%, n=77), Flexall® (6%, n=61), and Voltaren® gel (5%, n=55) with non-infused KT (Table 4).

The most common clinical measures used by respondents to assess the efficacy of KT were patient reported outcomes (80%, n=862), girth measurements (43%, n=463), joint range of motion (40%, n=435), sports specific assess-

ment (40%, n=437), movement-based testing (36%, n=393) and muscle performance (strength) testing (31%, n=337) (Table 4).

#### KT EDUCATION AND REFERRAL

Regarding skin prep before applying KT, sixty-four percent (n=695) of respondents provided client instructions. Common instructions included to clean and dry skin (53%, n=576), avoid lotions, oils, topicals, or gels (37%, n=396), and trim or remove hair on the body region (12%, n=131) being taped. Thirty-six percent (n=388) of respondents did

**Table 2: Clinical perceptions about KT (N=1083)**

<b>*What are common reasons you use KT on your clients?</b>	
Performance enhancement	20.78% (225)
Injury prevention	15.42% (167)
Post-injury treatment (e.g. edema, ecchymosis)	74.24% (804)
Pain modulation	66.85% (724)
Neuro-sensory feedback (e.g. proprioception)	60.30% (653)
Myofascial mobility	24.01% (260)
Neuromuscular re-education	45.52% (493)
Pre-exercise warm-up	1.39% (15)
Post-exercise treatment	6.00% (65)
Placebo effect	40.44% (438)
Posture feedback	0.64% (7)
Patient requests KT	1.38% (15)
Joint support	0.46% (5)
Edema or swelling	0.74% (8)
Other	7.01% (76)
<b>*Which factors have influenced how you apply KT to your clients?</b>	
Peer reviewed research articles, textbooks	53.55% (580)
Continuing education courses or conferences	74.33% (805)
Manufacturer instructions	28.90% (313)
KT textbooks	0.83% (9)
Websites, social media posts, or videos (e.g. YouTube)	31.10% (338)
Collaboration with other professionals	74.98% (812)
My prior empirical experience	64.08% (694)
Patient interest	1.66% (18)
Other variables not listed	5.36% (20)
<b>*What therapeutic effects do you believe occur with KT?</b>	
Enhanced myofascial mobility	29.46% (319)
Pain modulation	69.80% (756)
Increased joint ROM	15.05% (163)
Enhanced stretch tolerance of muscles	13.48% (146)
Enhanced post-exercise recovery	12.56% (136)
Enhanced pre-exercise neuromyofascial excitation	13.11% (142)
Enhanced proprioception and kinesthetic sense	69.10% (748)
Enhance muscle activation/motor control	0.64% (7)
Inhibit muscle activation/motor control	0.28% (3)
Increases in local circulation (e.g. lymphatic)	65.47% (709)
Decreased edema, swelling, and/or effusion	0.28% (3)
Postural awareness	0.18% (2)
Placebo effect	58.63% (635)
Other effects not listed	3.23% (35)
<b>*Which physiological mechanisms do you believe occur with KT?</b>	
Tape lifts the skin to allow improved local circulation	69.16% (749)
Tape stimulates skin mechanoreceptors increasing proprioception	77.00% (834)
Tape stimulates skin nociceptors resulting in pain modulation	60.20% (652)
Tape help improve joint range of motion	15.24% (165)
Tape helps improve muscle performance (strength)	13.85% (150)
Tape helps improve muscle activation and motor control	46.26% (501)

Tape can inhibit muscle activation	31.86% (345)
Tape can create a placebo effect	73.68% (798)
Other physiological mechanisms not listed	1.38% (15)
<b>*What therapeutic effects do you believe occur with your preferred KT tension length you use with clients?</b>	
Enhanced myofascial mobility	23.45% (254)
Pain modulation	55.31% (599)
Increased joint ROM	9.42% (102)
Enhanced stretch tolerance of muscles	10.80% (117)
Enhanced post-exercise recovery	6.74% (73)
Enhanced pre-exercise neuromyofascial excitation	10.06% (109)
Enhanced proprioception and kinesthetic sense	58.73% (636)
Increases in local circulation (e.g. lymphatic)	43.31% (469)
Placebo effect	43.86% (475)
Joint stability	0.83% (9)
Muscle inhibition	0.18% (2)
Other effects not listed	1.01% (11)
<b>**Which general precautions do you believe are most important with kinesiology tape?</b>	
Skin reaction/allergy (e.g. irritation, itching)	50.69% (549)
Thin skin (e.g. common in elderly)	25.48% (276)
Lymph node removal	2.86% (31)
Connective tissue disorder (e.g. Marfan syndrome)	3.79% (41)
Medications that alter sensation	1.57% (17)
Pregnancy	1.39% (15)
impaired or altered sensation	9.08% (87)
Unusual pain or discomfort	6.19% (67)
<b>***What other precautions should professionals consider with kinesiology tape?</b>	
No other precautions	94.92% (1,028)
Prior skin reaction to KT	0.74% (8)
Allergy to adhesives or latex	0.74% (8)
Patient understanding, compliance, and self-efficacy	1.01% (11)
Patient ability to self-apply tape	0.37% (4)
Patients with impaired judgement/cognition	0.65% (7)
Other reason not listed above	1.57% (17)
<b>**Which contraindications do you believe are most important with kinesiology tape?</b>	
Diabetes	2.40% (26)
Peripheral neuropathy	1.39% (15)
Acute injury	1.57% (17)
Skin with open wounds or lesions	32.87% (356)
Allergy to adhesives, latex, or synthetic tapes	33.33% (361)
Deep vein thrombosis	4.80% (52)
Congestive heart failure	1.66% (18)
Malignancy (active)	3.51% (38)
Renal insufficiency	0.28% (3)
Infection or fever	1.85% (20)
Undiagnosed rash or skin irritation	3.69% (40)
Inability to communicate	13.48% (146)
Lymph edema	0.55% (6)
<b>**What other contraindications should professionals consider with kinesiology tape?</b>	
No other contraindications	84.76% (918)

Patient willingness, mental status, or dependence	1.11% (12)
Inability to reach a body region	0.74% (8)
Skin sensitivity or tolerance	1.66% (18)
Fragile or thin skin	1.94% (21)
Other contraindications not listed	9.79 (106)

\* Respondents chose all options that applied to them; \*\* Respondents ranked their answers; \*\*\* Respondents provided answers in a comment section; KT= kinesiology tape; ROM=range of motion

not provide any skin prep instruction (Table 5).

Most respondents (77%, n=837) provided tape removal instructions to the clients. Common instructions included slowly removing tape (44%, n=474), applying oil (mineral, baby) to tape or use of adhesive remover (18%, n=191), wetting tape before removal (10%, n=113), and do not rip off tape (7%, n=67). Twenty-three percent (n=246) did not provide any tape removal instructions (Table 5).

The average time respondents recommended clients to wear KT was two (32%, n=344) and three days (38%, n=406). The maximum time respondents recommended clients to wear KT was for five days (33%, n=357), three days (24%, n=259), four days (13%, n=140), and two days (11%, n=114) (Table 5).

The most common type of client education was live instruction (89%, n=960), and most respondents referred clients to generic websites (65%, n=704), retail stores (43%, n=469), or manufacturer websites (26%, n=277) to purchase KT. Twenty four percent (n=258) of respondents did not provide recommendations to clients on KT purchases (Table 5).

## DISCUSSION

This cross-sectional study was the first survey to document healthcare professionals' beliefs and clinical practices for KT. We attempted to provide insight into the practices of clinicians using KT and to answer clinical questions that have been unanswered in the body of KT evidence to inform future research. The results of our study, combined with the immense body of research, may help discern why inconsistencies may be found in the literature, while also providing awareness of common clinical KT practices to guide future research efforts.

### RESPONDENT CLINICAL PERCEPTIONS OF KT

Professionals reported using KT for pain modulation (60-70%), neuro-sensory feedback (e.g. proprioception) (60-77%), neuromuscular re-education (45-46%), post-injury treatment (e.g. increase local circulation; 65-74%), myofascial mobility (24-29%), and placebo effect (40-74%). The respondents, however, reported using continuing education (74%), professional collaboration (75%), and prior experience (64%) to inform their clinical application of KT with clients. Interestingly, these sources were noted more often than peer reviewed research (53%). The current results are similar to prior myofascial intervention survey research examining clinician perceptions of IASTM; clinicians often sought out informal sources of information and utilize

personal experience to guide their clinical practice.<sup>44</sup> The varied sources of information and training may also help explain the variations in KT use in clinical practice and research, while also potentially explaining respondent beliefs about the clinical use, therapeutic benefits, and physiological effects of KT. Thus, clinician beliefs may be influenced by peer-reviewed research; however, it is also possible clinician beliefs may be more influenced by informal educational sources, as part of KT training provided by a commercial entity, or by their own clinical experiences than by the research evidence (Table 2).

For pain modulation, the research is inconclusive with some studies reporting poor efficacy when using KT for pain related to musculoskeletal injury<sup>2</sup> and chronic musculoskeletal pain.<sup>16,17</sup> While some researchers report weak to moderate evidence for myofascial<sup>30</sup> and low back pain.<sup>32-34</sup> For post-exercise soreness, several researchers have documented that KT may diminish the effects of delayed onset of muscle soreness (DOMS) after intense exercise.<sup>45-48</sup> For neuro-sensory feedback and muscle re-education, there are mixed results in the literature. Two studies compared KT versus placebo on knee joint position sense in healthy subjects;<sup>49,50</sup> a significant group differences was not found in either study, questioning the efficacy of KT for this type of intervention. Other researchers, however, have reported KT improved proprioception in post-ACL repair individuals<sup>51</sup> and elderly individuals when the tape was combined with exercise (Table 2).<sup>52</sup>

For increasing circulation post injury/surgery, several studies suggest KT may increase local microcirculation<sup>53-55</sup> and skin temperature,<sup>53-55</sup> while decreasing tissue edema.<sup>56</sup> Other researchers, however, did not find any significant changes in local microcirculation after KT was applied.<sup>57</sup> Respondents also use KT to enhance myofascial mobility, which has some evidence in the literature for causing deformation of the different skin and myofascial layers locally<sup>58,59</sup> and distally<sup>59</sup> which supports the mechanical effects of the tape.

A substantial portion of respondents also believed KT only creates a physiological placebo (40%), and a large portion of respondents indicated using it for such therapeutic placebo effects (58%) with their clients (Table 2). Several studies have investigated the placebo effects of facilitatory and inhibitory KT taping techniques. One study found that KT promoted increased grip strength among healthy individuals but did not find any electromyography (EMG) changes in the forearm muscles, which suggests some type of indirect placebo effect.<sup>60</sup> Others have not found any differences between KT facilitation, inhibition, sham taping, or no taping for muscle activity, strength, power, or per-

**Table 3: Clinical application of standard and specialty KT (N=1083)**

<b>*Which commercial brand KT do you commonly use in your practice?</b>	
KT Tape	59.10% (640)
RockTape	50.41% (546)
Kinesio Tex	33.15% (359)
P-TEX	0.37% (4)
TheraBand	10.71% (116)
Spider Tech	3.42% (37)
Strength Tape	1.02% (11)
Mueller	7.39% (80)
Dynamic	3.41% (37)
Levotape	0.83% (9)
Leukotape	0.18% (2)
Other brands not listed	9.04% (98)
<b>*Which color/s of KT do you use most often with your clients? (colors without specialty designs)</b>	
Black	71.47% (774)
Beige	65.83% (713)
Blue	30.66% (332)
Pink	17.63% (191)
Green	2.68% (29)
Purple	4.80% (52)
Red	7.94% (86)
Yellow	0.46% (5)
Orange	0.37% (4)
Skin tone	0.46% (5)
White	0.27% (3)
<b>*Which types of standard KT do you use most often on your clients? (standard roll and pre-cut tape)</b>	
Pre-cut strips (2 in x 10 in) (5 cm x 25 cm)	15.51% (168)
Pre-cut strips (4 in x 10 in) (10 cm x 25 cm)	3.05% (33)
Pre-cut strips for digits (1 in x 10 in) (2.54 cm x 25 cm)	0.37% (4)
Uncut roll (2 in x 16.4 ft) (5 cm x 5 m)	66.85% (724)
Uncut roll (3 in x 16.4 ft) (7.5 cm x 5 m)	10.53% (114)
Uncut roll (4 in x 16.4 ft) (10 cm x 5 m)	6.19% (67)
Uncut roll for digits (1 in x 16.4 ft) (2.5 cm x 5 m)	0.74% (8)
Uncut large roll (2 in x 105 ft) (5 cm x 32 m)	35.92% (389)
Uncut large roll (4 in x 105 ft) (10 cm x 32 m)	4.71% (51)
<b>*Which types of specialty pre-cut KT do you most often use in your practice?</b>	
Blister prevention tape	0.92% (10)
Pre-cut fan tape (e.g. edema, bruising, lymphatic drainage)	8.86% (96)
Pre-cut X tape	2.03% (22)
Pre-cut tape for the upper body regions	3.51% (38)
Pre-cut tape for the lower body regions	3.97% (43)
I do not use specialty pre-cut tape	83.28% (902)
I cut my own tape	0.37% (4)
<b>When applying the KT, what is the most common tension length percentage you use for your clients?</b>	
25% tension	24.75% (268)
50% tension	47.09% (510)
75% tension	18.37% (199)
100% tension	2.12% (23)



125% tension	0.74% (8)
150% tension	0.28% (3)
175% tension	0.09% (1)
No tension	6.56% (71)

\* Respondents chose all options that applied to them; KT= kinesiology tape

ceived maximum strength for the forearm muscles,<sup>61–63</sup> quadriceps,<sup>64–67</sup> and calf muscles.<sup>67</sup> Researchers have also reported no therapeutic differences between KT, sham tape, and control group for individuals with lateral epicondylitis<sup>68–70</sup> and chronic low back pain.<sup>71</sup> Professionals should consider that these results are limited to the study methods (e.g. placebo) and study populations; further research is needed to confirm or refute the placebo effects for different populations.

For KT tension length, most of the respondents believed their preferred tape tension length enhanced proprioception and kinesthetic sense (59%) and modulated pain (55%), while a substantial portion felt it increased local circulation (43%), enhanced myofascial mobility (23%), and provided a placebo effect (40%) (Table 2). The research on the efficacy of tape length tension will be further discussed in the next section on clinical application of KT.

For *precautions*, most respondents considered skin reaction (51%), thin skin (25%), and impaired or altered sensation (e.g. diabetes neuropathy) as the most important to consider for potential KT application adverse events (Table 2). There is a small body of research that has directly studied the side effects and tolerability of KT among individuals with neurological disorders,<sup>72,73</sup> cancer related lymphoedema,<sup>74,75</sup> and healthy individuals.<sup>76</sup> The incidences of side effects (e.g. skin reaction) or intolerance reported among these studies ranged between 4% to 33%.<sup>72–77</sup> Unfortunately, the research on KT side effects is sparse. The existing data may not represent the actual number of occurrences among different client populations such as athletes and individuals with musculoskeletal disorders.<sup>77</sup> These two populations may use KT the most and may not be well represented in the current literature. Sports medicine professionals could benefit from knowing the incident rates of KT side effects in this population to improve clinical decision making and inform their practice patterns.

For KT contraindications, most respondents considered skin allergies (33%), open wounds and lesions (33%), and inability to communicate (13%) as the most important (Table 2). Some researchers suggest using a small piece of KT on the forearm to check for a skin reaction to the tape (e.g. redness, itching, etc) noted within 15 minutes.<sup>78</sup> These precautions and contraindication align with recommendations in the literature but may not represent all possible conditions.<sup>77,79–81</sup> Professionals should consider that these conditions have not been fully investigated and should properly screen each client prior to administering KT as an intervention.

#### CLINICAL APPLICATION OF KT

Most respondents (47%) purchased tape from three manu-

facturers, but our results also indicate that clinicians utilize KT from a variety of manufacturers. Clinicians reported using a variety of popular KT colors with clients: black (71%), beige (66%), blue (31%), and pink (18%) (Table 3). Researchers have previously examined the influence of KT color on athletic performance, quadriceps strength, and neuromuscular function among healthy individuals.<sup>82</sup> Five conditions were measured: no tape, KT beige sham, beige KT with 50% tension, red KT with 50% tension, and blue KT with 50% tension.<sup>82</sup> The researchers found that KT, regardless of color or condition, did not alter athletic performance, lower leg strength, or neuromuscular function.<sup>82</sup> The current evidence suggests clinicians may utilize the KT colors preferred by their clients without concerns for it detrimentally affecting athletic performance.

Respondents most often used the KT standard uncut rolls (67%), followed by the large standard uncut roll (36%) then standard pre-cut strips (15%). These respondents did not indicate the use of any specialty pre-cut strips (83%), commercially infused tape (99%), or a combination of a topical analgesic and non-infused tape (65%) in clinical practice; however, a small portion of respondents (23%) did report combining Biofreeze with non-infused tape (Table 3 and 4). While previous research on KT practice patterns was not identified in the literature, the current findings are not unexpected. Clinicians have reported using a variety of IASTM instruments and utilizing instruments from numerous manufactures<sup>44</sup>; thus, it is not surprising to have similar practice patterns arise with KT. Research regarding the therapeutic effects of different infused KT or the effects of a non-infused KT with a topical analgesic was also not identified in the literature. Due to this lack of evidence, professionals will need to rely on the assessment of patient outcomes and good clinical judgement when matching a specific tape to their clients.

Respondents reported commonly used a KT tension length range of 25–75%, with 50% tension (47%) being the most used among respondents (Table 3). While the actual tension force being used was not validated with the survey responses and the current results do not elucidate whether or how clinicians adjust the tension length based on pathology or patient need; however, the respondent choices for tension length are consistent with general KT recommendations in the literature. A 25% to 50% tape tension length has been recommended for treatment of fascia and circulatory conditions, stimulating, and inhibiting muscle activity.<sup>85</sup> A tension length range of 75 to 100% has been recommended for treatment of tendons and ligaments.<sup>85</sup> These recommendations are often shared among professionals, but are not necessarily evidence based.

Different KT tensions were not found to have positive effects among healthy individuals for quadriceps

**Table 4: Clinical application of Infused KT, topicals, and clinical measures (N=1083)**

<b>*Which type/s of commercial infused KT do you use with your clients?</b>	
Tape infused with CBD (Hemp)	0.18% (2)
Tape infused with Menthol	0.28% (3)
Tape infused with Copper	0.18% (2)
Tape infused with Tourmaline	0.09% (1)
I do not use infused tape	99.54% (1078)
<b>*Which commercially available topical analgesic/s due you use in combination with non-infused KT? (most common brands or types)</b>	
Biofreeze	23.55% (255)
Tiger Balm	3.51% (38)
Flexall	5.63% (61)
RockSauce Fire	9.05% (98)
RockSauce Ice	7.11% (77)
Solonpas	1.29% (14)
IcyHot	1.39% (15)
Mineral Ice	0.18% (2)
Ben Gay	0.18% (2)
CBD Topical	2.22% (24)
Cramer Atomic Balm	1.75% (19)
Arnica	3.60% (39)
Voltaren Gel	5.08% (55)
Hydro cortisone	0.92% (10)
Sombra	1.75% (19)
Other brands not listed	3.51% (38)
I do not use any topical analgesic	65.00% (704)
<b>*What clinical measures do you use to assess the effects of KT?</b>	
Joint range of motion (e.g. goniometer, inclinometer)	40.17% (435)
Pressure pain threshold (e.g. algometer)	17.08% (185)
Patient reported outcomes (e.g. NRS, VAS pain scales)	79.59% (862)
Movement based testing (e.g. FMS, SFMA)	36.29% (393)
Muscle performance (strength) testing	31.12% (337)
Activity or sports specific assessment	40.35% (437)
Girth measurements (e.g. edema)	42.75% (463)
Gait assessment	0.55% (6)
Palpation	0.37% (4)
Observation/visual changes	0.65% (7)
Other measures not listed	0.92% (10)
I do not use clinical measures to assess the effects of KT	11.08% (120)

\* Respondents chose all options that applied to them; KT= kinesiology tape; CBD: Cannabidiol

strength,<sup>84,85</sup> knee joint range of motion,<sup>85</sup> lower extremity hop test,<sup>84</sup> the gastrocnemius and soleus H-Reflex,<sup>86,87</sup> and EMG activity of the quadriceps and hamstrings during a loaded squat exercise.<sup>88</sup> However, other researchers have reported that KT does facilitate the H-Reflex<sup>89</sup> and shoulder muscle EMG activity<sup>90</sup> among healthy individuals. Researchers have also documented that different tape tension lengths (15-50%) did not produce significant changes in EMG paraspinal muscle activity among individuals with chronic low back pain<sup>91,92</sup> and non-specific low back

pain.<sup>93</sup> The research on KT tension length is inconclusive and has been focused more on healthy versus injured participants, which presents a barrier for interpreting the research. Without sound evidence to guide practice, professional will be forced to rely on their clinical outcomes, personal preferences, or information from informal sources to guide tension length due to the lack of evidence.

For clinical measures, most respondent used patient reported outcomes (80%), girth measurement (43%), joint ROM (40%), movement-based testing sports specific assess-

**Table 5: KT education and referral (N=1083)**

<b>Do you instruct your clients to prepare their skin before applying the KT?</b>	
Yes	64.17% (695)
No	35.83% (388)
<b>*If yes to the prior question, what instructions do you provide to your clients?</b>	
Clean and dry skin (e.g. soap/water, isopropyl alcohol)	53.18% (576)
Avoid lotions, oils, topicals, or gels	36.56% (396)
Trim or remove hair in body region	12.10% (131)
Inspect skin integrity, rashes, open wounds, etc.	1.10% (12)
<b>Do you instruct your clients on how to safely remove the KT?</b>	
Yes	77.29% (837)
No	22.71% (246)
<b>*If yes, what instructions do you provide to your clients for removing KT?</b>	
Wet tape before removal	10.44% (113)
Remove tape slowly	43.77% (474)
Remove tape slowly and pull skin in opposite direction	1.75% (19)
Remove tape in the direction of hair growth	5.35% (58)
Remove tape parallel to skin	2.21% (24)
Apply oil (baby, mineral) to tape, or use adhesive remover	17.64% (191)
Do not rip off tape	6.19% (67)
<b>What is the average time you recommend clients to wear KT?</b>	
Less than One Day	2.40% (26)
One Day	8.59% (93)
Two Days	31.76% (344)
Three Days	37.49% (406)
Four Days	8.03% (87)
Five Days	4.06% (44)
Greater than 5 days	1.57% (17)
I do not recommend	6.09% (66)
<b>What is the maximum time you recommend clients to wear the KT?</b>	
Less than One Day	1.11% (12)
One Day	3.14% (34)
Two Days	10.53% (114)
Three Days	23.92% (259)
Four Days	12.93% (140)
Five Days	32.96% (357)
Greater than 5 days	5.82% (63)
I do not recommend	9.60% (104)
<b>**What are common types of education you use to teach clients about KT?</b>	
Live instruction	88.64% (960)
Video instruction	3.14% (34)
Self-guided program (e.g. client chooses parameters)	3.97% (43)
Education materials (e.g. handouts with exercises)	4.25% (46)
<b>***Where do you direct your clients to purchase KT?</b>	
Manufacturer website	25.58% (277)
Generic websites (e.g. Amazon)	65.00% (704)
Retail Store (brick and mortar)	43.30% (469)
Sell in my facility	16.90% (183)
Provide it free to patients	1.57% (17)

Commercial distributor/medical supply	0.28% (3)
I don't recommend	23.82% (258)
Other recommendations not listed	5.82% (6)

\* Respondents provided answers in a comment section; \*\* Respondents ranked their answers; \*\*\* Respondents chose all options that applied to them

ments (40%), movement-based testing (36%), and muscle performance (31%) to measure the effects of KT (Table 4). These outcomes are commonly used in the research<sup>2,18,27–30,33</sup> and are similar to the types of outcome measures used by clinicians when assessing the effectiveness of IASTM.<sup>44</sup>

#### KT EDUCATION AND REFERRAL

For *skin prep*, most respondents (64%) instructed patients to clean and dry skin first, avoid topical lotions, oils, and gels, and to trim or remove hair on the body region being taped. For *KT removal*, most respondents (77%) instructed their patients to slowly remove the tape, applying oil (mineral, baby) to tape or use of adhesive remover, wet tape before removal, and do not rip off the tape (Table 5). The results of the survey demonstrate some common instructions often taught by tape manufacturers or shared among professionals.<sup>77</sup> The most concerning finding was that 36% of respondents did not provide any skin prep instructions and 23% did not provide any tape removal instructions to their clients (Table 5). The current findings are consistent with previous research on IASTM clinician practice patterns for following training recommendations; researchers reported that more than 45% of their respondents indicated failing to following training recommendations from some to all the time.<sup>44</sup> The lack of instruction or failure to following training or best practice recommendations may present a risk for injury because the clinician or client may not use the tape correctly. Currently, research is lacking on the best practice recommendations for skin prep and KT removal and little is known about any potential related complications (e.g. allergic reaction, infection, etc.) to KT use in this area.

For *length of time wearing tape*, most respondents (70%) recommended for clients to wear KT an average of two to three days with a maximum wear time of three to five days (Table 5). These recommendation are consistent with research that has examined the effects of KT wear time of three to seven days on balance and functional performance among healthy individuals,<sup>94</sup> among individuals with myofascial pain syndrome and trigger points,<sup>95–98</sup> chronic ankle instability,<sup>99</sup> subacromial shoulder impingement,<sup>100,101</sup> rheumatoid arthritis,<sup>102</sup> knee osteoarthritis,<sup>103</sup> total knee replacement,<sup>104</sup> and lymphedema.<sup>105</sup> Studies have also been performed measuring hamstring extensibility,<sup>106</sup> increased local tissue temperature,<sup>54</sup> and quadriceps strength<sup>107</sup> in subjects wearing KT within this time range. Survey respondent recommendations for KT wear time seem to be in line with the research. Professionals should determine KT wear time on an individual basis and always monitor for side effects such as skin irritation or allergy,<sup>77</sup> and future research should examine how clinicians adjust wear time based on client need or clinical scenario.

Most respondents used live education (89%) for the clients and referred them to generic websites (65%) and retail stores (43%) to purchase KT. Twenty four percent did not provide recommendations (Table 5). Unfortunately, there is no research measuring the efficacy of different modes or instruction or the influences on professional referral to purchase KT. Only one related myofascial intervention study measured the efficacy of different modes of education for myofascial rolling. The researchers compared a 2-minutes live instruction, video instruction, and a self-administered program for the quadriceps. The study outcomes were passive knee flexion range of motion and pain threshold. The researchers found that all modes produced similar post intervention outcomes for all measures. The researchers concluded that professionals should match the best instructional mode to each patient to provide the best experience.<sup>108</sup> Future studies are needed with KT.

#### PRACTICE IMPLICATIONS AND FUTURE RESEARCH

This survey revealed several trends in the beliefs and clinical application of KT among healthcare professionals: a gap exists between the respondent beliefs, professional practices, and the current evidence. Weaknesses in the research for guiding clinical practice may be caused by two primary issues: tape manufacturing and study method differences. *First*, the large body of research consists of studies that have used different tape brands. This presents a major issue when comparing study outcomes due to the differences among tape mechanical properties (e.g. tension, strain). Three recent studies measured the material and mechanical properties of 23 different KT brands and found all had different mechanical properties making it difficult for a direct comparison across studies.<sup>83,109,110</sup> *Second*, most of the KT research has variable outcomes due to different study methods and these study methods do not always match common clinical practice. Researchers have used different manufactured tape, taping techniques (e.g. tape elongation length), and outcomes which prevents a direct comparison or reproducibility among studies or direct translation to clinical practice.<sup>11,12,18</sup>

The KT conflicting evidence creates a gap between professional practice, education, and research. Professionals may rely on their own preferred KT techniques because there are discrepancies between the KT guidelines, techniques taught in professional education courses,<sup>77</sup> application in clinical practice, and what is reported in the research. As noted in the introduction, thirty-eight systematic reviews have been published since 2010 with inconclusive results. These issues may reflect the portion of respondents that believe KT only creates a physiological placebo (40%) and use it for such therapeutic placebo effects (59%) with their clients. Future research needs to ad-

dress the issues of variations across tape manufacturing and study methods, while also exploring adverse and long-term effects of KT application. Further, researchers need to establish the most common clinical practice patterns for KT application to inform study methodologies. In addition to examining the effects of KT, researchers also must learn how clinician training influences KT application and patient outcomes, how clinicians determine KT tension and wear time and how these factors influence patient outcomes, and how individual client differences (e.g., age, activity level, pathology, etc.) influence KT application.

#### LIMITATIONS

Several limitations need to be discussed for this investigation. First, this survey was sent electronically to a cross-sectional sample of healthcare professionals with a 2.1% response rate. A larger sample or a different method for sampling with a higher response rate may have produced different results; the results could be influenced by non-response error. However, to the researcher's knowledge this is the first KT survey study. Second, the results can only be generalized to the healthcare professionals surveyed. Other healthcare professionals may have provided different responses. Third, the survey contained a limited number of items. Different questions may have revealed different ideas of how professionals use KT. For example, the survey did not ask about respondent preference for KT direction such as the tape is tensioned along muscle origin to insertion for facilitation or opposite for inhibition. The current evidence contradicts these directional techniques.<sup>111-114</sup> The survey focused on tape tension length only versus direc-

tional strategies. Finally, this survey was sent to members of three professional organizations. The results may not fully represent the perceptions and practices from other non-member healthcare professionals. However, the results do provide insight into responses among different healthcare professionals, but further research is needed to determine how respondent demographics may have influenced KT perceptions.

#### CONCLUSION

This is the first KT survey to document professional beliefs and clinical practices for KT. Professionals use different types and brands of KT. They also apply KT with different lengths and tensions to treat a variety of conditions, including as a placebo by nearly 60% of the respondents. Professionals also believe KT provides numerous positive therapeutic effects for clients, but little is known regarding how the therapeutic effects might be produced with KT application. The KT conflicting results may be caused by two primary issues: tape manufacturing and study method differences. Future research addressing these two issues should be pursued to validate or refute the efficacy of KT.

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#### CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest with this study.

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