DOI: 10.7860/JCDR/2024/71034.19707

Original Article

Physiotherapy Section

Effect of Mulligan Calcaneal Taping on Dynamic Balance and Functional Performance in Subjects with Plantar Fasciitis: A Prospective Cohort Study

CHETNA JAKHOTIYA[1], RIDDHI ASHISH SHROFF[2], PRANITA GANJAVE[3]

ABSTRACT

Introduction: Plantar fasciitis is the most common cause of heel and foot pain, leading individuals to use compensatory techniques to alleviate their pain, resulting in an antalgic gait. These compensations alter the feeling of joint position and muscle activation, making it challenging to maintain an upright posture within the base of support. According to Mulligan's concept, rigid tape allows painful or restricted movements with quick pain relief and increased range of motion while correcting positional faults and reducing tensile tension on the fascia, thereby decreasing inflammation and microscopic tears. Currently, there is a scarcity of data studying the effect of Mulligan's calcaneal taping on dynamic balance.

Aim: To evaluate the effect of Mulligan's calcaneal taping on dynamic balance and functional performance in subjects with plantar fasciitis.

Materials and Methods: The study was a prospective cohort study conducted at D.Y. Patil Hospital and Research Centre, Navi Mumbai, Maharashtra, India. It began in March 2023 and concluded in March 2024, spanning one year. Thirty-six subjects were randomly divided into group A (n=18) and group B (n=18). Subjects experiencing pain for more than six weeks, aged between 18-60 years, with a positive Windlass test, plantar medial heel pain, and abnormal foot posture index (between +6 to +9) were included in the study. The experimental group received Mulligan's calcaneal taping along with conventional physiotherapy exercises, while the control group received only conventional physiotherapy exercises. Pre-post assessments were conducted using the star excursion balance test for dynamic balance assessment and the Foot Function Index (FFI) for functional performance.

Results: Statistically significant differences were found among the medial (p-value=0.0212), posteromedial (p-value=0.0199), and posterior (p-value=0.0091) directions of the star excursion balance test. Both groups did not show statistically significant differences in the FFI score. However, with effect size, there was good clinical significance for the FFI score and all directions of the star excursion balance test except the posterolateral direction.

Conclusion: Mulligan calcaneal taping has been shown to be more effective in improving dynamic balance in subjects with plantar fasciitis.

Keywords: Foot function, Heel, Inflammation, Pain

INTRODUCTION

Plantar fasciitis is the most common cause of heel and foot pain, caused by inflammation and degeneration of the plantar fascia, contributing to 15% of all foot pathologies [1]. It is an overuse injury that mostly arises from microtears of the plantar fascia caused by repetitive strain, although it can also occur from trauma and other multifactorial causes [2]. Hicks originally defined the foot and its ligaments as a triangular structure, or truss, resembling an arch [3]. The tibia loads the foot "truss" and generates tension via the plantar fascia when bearing weight, known as the Windlass mechanism [4]. Plantar fasciitis is primarily characterised by significant acute pain, primarily at the site where the plantar fascia attaches to the anterior calcaneus [5]. Plantar fasciitis can be caused by several factors, such as excessive pronation of the foot, caused by adduction of the talus and plantar flexion during weight bearing, which causes the calcaneus to evert in 81-86% of cases [6]. Plantar fasciitis is a foot disorder that causes discomfort in the plantar fascia, leading to balance issues [7], as studies have concluded that dynamic balance is affected in patients with plantar fasciitis when compared to healthy individuals [8]. Literature has shown the use of different taping techniques as a management of plantar fasciitis, with rigid tape or athletic tape being one of them [1]. According to Mulligan's concept, while using rigid tape, painful and restricted movements can benefit from quick pain relief and increased range of motion while retaining positional fault correction [9]. Mulligan's calcaneal taping focuses on correcting faulty biomechanics of the rear foot [4]. The height of the medial longitudinal arch increases with calcaneal taping, which can correct calcaneal eversion and bring it almost to neutral. As a result, the plantar fascia may experience less tensile tension, which lessens inflammation and microscopic tears [10].

The application of the tape ensures that the therapeutic glide is preserved, setting it apart from conventional taping techniques. Individuals experience pain and discomfort due to plantar fasciitis and adopt a compensatory gait pattern, leading them to walk with an antalgic gait [10,11]. This can affect individuals' ability to carry out daily activities like household chores, work tasks, or any recreational activity, affecting functional performance. The study aimed to evaluate the effect of Mulligan's calcaneal taping on dynamic balance and functional performance in subjects with plantar fasciitis.

MATERIALS AND METHODS

This prospective cohort study was conducted at D.Y. Patil Hospital and Research Centre, Navi Mumbai, Maharashtra, India, study started in March 2023 and ended in March 2024 spanning one year. Ethical approval was obtained from the Institutional Ethical Committee (IEC) for Biomedical and Health Research at D.Y. Patil School of Medicine, Navi Mumbai (IEC ref. No: DYP/IECBH/2023/233). Informed consent was obtained from all subjects, and the procedure was properly explained.

Inclusion criteria: Both males and females experiencing pain for more than six weeks, aged between 18 and 60 years, with a positive Windlass test [11], along with plantar medial heel pain [11] and an abnormal Foot Posture Index [11] (ranging from +6 to +9), were included in the study.

Exclusion criteria: Participants with heel pain, except in medical aspects, who had received any medical or surgical treatment prior to or during the study period, used any assistive device for ambulation, had systematic inflammatory arthritis, cancer, active tuberculosis, psychological disturbances, or had undergone previous surgery on the lower limb in the last year, were excluded from the study.

Sample size calculation: The sample size was calculated using the formula

$$n=2S^2 (Z1-\alpha+Z1-\beta)^2/d^2,$$

where Z1-β=Z-value for β level (1.96 at 5% β error or 95% confidence) and Z1-β=Z-value for β level (1.2820 at 10% β error or 90% power). Here, d=Margin of error=1.02, S=Pooled SD=(S1+S2)/2. A total of 36 subjects were included, with 18 in each group. This sample size calculation was based on a pilot study conducted, and the SD values obtained were S1=0.97 and S2=0.96.

Study Procedure

The subjects were divided into two groups, group A and group B, using the simple random sampling method. In both groups, baseline measurements and postmeasurements were taken using the star excursion test for dynamic balance and the FFI for functional performance.

The subjects in 'group A' were given treatment with Mulligan's calcaneal taping, as shown in [Table/Fig-1], and exercises. To apply the tape, at the beginning, one end of the tape was placed diagonally on the lateral surface of the affected calcaneum. The therapist then moved and held the calcaneum in external rotation and adduction with one hand while sustaining the glide, and at the end, the tape was pulled and wrapped around the ankle medially. The tape was removed after two days, and the patient was given an exercise program with the tape applied on the foot.

[Table/Fig-1]: Mulligan calcaneal taping.

The subjects in 'group B' were treated only with exercises similar to group A, which included heel raises, toe raises, foot doming, toe spread out, plantar fascia stretching, tendo-Achillis stretching, with one set of 10 repetitions each. Both groups received two supervised sessions per week and a home exercise program for two weeks. Post-treatment measurements were taken for both groups after two weeks of treatment using the star excursion test for dynamic balance and the FFI for functional performance.

Star excursion test: The star excursion test was performed by drawing a star on the ground with masking tape. Eight directions were drawn, each 120 cm from the center. The subject used the right foot as the reaching foot and the left leg for balance, completing the circuit in a clockwise fashion [12]. When balancing on the right leg, the subject performed the circuit in an anticlockwise fashion. With their hands firmly placed on their hips or shoulders, the subject was instructed to reach with one foot as far as possible, lightly touching the line before returning to the starting upright position. A spot was marked where the individual's toe touched the line and measured from the center spot after the test to calculate the reach distance of each reach direction. After completing a full circuit with the affected foot, this process was repeated three times. The first reach was labeled as Reach 1, the second as Reach 2, and the third as Reach 3. The scoring was conducted as follows [12]:

- Average distance in each direction (cm)=(Reach 1+Reach 2+ Reach 3)/3

- Relative (normalised) distance in each direction (%)=(Average distance in each direction/leg length)*100 [13].

Foot Function Index (FFI): The FFI was developed in 1991 to measure the impact of foot pathology on function in terms of pain, disability, and activity restriction [14]. It is a self-administered index consisting of 23 items divided into three subscales. Both total and subscale scores are produced. The FFI questionnaire was explained to the subjects, and the scoring was based on the subject's response to each question. It consists of three subscales which include pain, disability, and activity limitation. Each question is scored on a scale of 0-10 (0= no pain or difficulty, 10= worst imaginable pain or difficulty) [14].

STATISTICAL ANALYSIS

The data obtained from the participants were analysed using Statistical Package for the Social Sciences (SPSS) software, version 29.0. An Independent sample t-test was performed for intergroup comparison. Cohen's d was calculated to estimate the standardised effect size. A p-value <0.05 was considered significant. For clinical significance, the interpretation of effect size values are as follows: <0.2=trivial effect; 0.2-0.5=small effect; 0.5-0.8=moderate effect, and >0.8=large effect [15].

RESULTS

The pretest and post-test intergroup comparison of balance measured by the star excursion balance test [Table/Fig-2] shows statistically significant improvement in the medial (p-value=0.0212), posteromedial (p-value=0.0199), and posterior (p-value=0.0091) directions. In effect size estimation, it indicates a large clinical significance (>0.8) in the medial (d=0.805), posteromedial (d 0.814), and Posterior (d=0.923) directions, except for the posterolateral direction (d=0.015). There is a moderate clinical significance (0.5-0.8) in the anterior direction (d=0.602) and small clinical significance (0.2-0.5) in the anteromedial (d=0.247), lateral (d=0.358), and anterolateral (d= 0.346) directions.

On the other hand, no statistically significant difference was observed for the pretest and post-test intergroup comparison of FFI scores with p-values of p=0.2665 and p=0.3348, respectively [Table/Fig-3]. However, the calculated effect size for the FFI (d=0.816) showed a large clinical significance for the pre and post-test scores between group A and group B. The larger clinical significance implies that the change is clinically important.

DISCUSSION

The purpose of the present study was to evaluate the effect of Mulligan calcaneal taping on dynamic balance and functional performance in subjects with plantar fasciitis compared to conventional physiotherapy. In the current study, subjects in both groups were given strengthening exercises for intrinsic foot muscles and stretching exercises for the plantar fascia and Achilles tendon. Only subjects in the experimental group received Mulligan calcaneal taping for two weeks. When studying the difference between group A

Parameters	Time	Group A	Group B	t-value	Effect size (d)	p-value
		Mean±SD	Mean±SD			
Anterior	Pretest	77.90±10.92	76.20±12.05	0.4457	0.149	0.6586
	Post-test	85.91±9.66	80.86±12.54	1.3547	0.452	0.1844
	Difference	8.01±6.16	4.66±4.88	1.8059	0.602	0.0798
Anteromedial	Pretest	83.32±13.71	79.27±10.88	0.9818	0.327	0.3331
	Post-test	89.79±10.71	84.00±11.70	1.5472	0.516	0.1311
	Difference	6.47±7.92	4.74±6.00	0.7408	0.247	0.4639
Medial	Pretest	83.57±13.47	78.80±11.25	1.1520	0.384	0.2574
	Post-test	92.49±12.08	83.23±12.19	2.2898	0.763	0.0284*
	Difference	8.93±6.38	4.43±4.67	2.4161	0.805	0.0212*
Posteromedial	Pretest	79.46±14.09	76.04±13.20	0.7518	0.251	0.4573
	Post-test	91.17±10.49	81.89±12.62	2.4001	0.800	0.0220*
	Difference	11.71±7.76	5.85±6.58	2.4426	0.814	0.0199*
Posterior	Pretest	74.94±15.31	74.11±12.73	0.1777	0.059	0.8600
	Post-test	87.15±13.24	79.67±11.98	1.7782	0.593	0.0843
	Difference	12.21±9.54	5.56±3.58	2.7685	0.923	0.0091*
Posterolateral	Pretest	71.10±14.59	69.56±12.50	0.3414	0.114	0.7349
	Post-test	77.61±13.79	75.88±14.87	0.3622	0.121	0.7195
	Difference	6.51±15.17	6.32±9.24	0.0444	0.015	0.9649
Lateral	Pretest	58.68±14.55	61.90±16.85	0.6139	0.205	0.5434
	Post-test	68.43±13.75	69.26±17.72	0.1561	0.052	0.8768
	Difference	9.75±5.79	7.36±7.47	1.0753	0.358	0.2898
Anterolateral	Pretest	74.09±13.86	73.27±13.23	0.1818	0.061	0.8568
	Post-test	82.43±12.99	79.81±14.95	0.5604	0.187	0.5789
	Difference	8.34±5.18	6.54±5.24	1.0341	0.346	0.3084

[Table/Fig-2]: Comparison of pre and post-test between group A and group B by independent t-test for star excursion balance test.
*A p-value <0.05 was considered to be statistically significant

Time	Group A	Group B	t-value	Effect size (d)	p-value
	Mean±SD	Mean±SD			
Pretest	29.19±16.19	34.33±10.48	-1.1298	0.244	0.2665
Post-test	16.41±10.10	19.34±7.68	-0.9783	0.254	0.3348
Difference	12.78±18.78	14.99±5.04	-0.4818	0.816	0.6331

[Table/Fig-3]: Comparison between group A and group B with Foot Function Index (FFI) pretest and post-test scores by independent t-test.

and group B, a statistically significant improvement was observed in the medial direction (p-value=0.0212), posteromedial direction (p-value=0.0199), and posterior direction (p-value=0.0091). The lack of statistical significance in other directions may be attributed to the short two-week intervention duration. Previous studies have shown statistically significant differences in all directions except for the posteromedial direction [16]. In this study, the posterolateral direction did not show any clinical or statistical significance. The reason for the lack of statistical improvement in the other directions may be that the change in distance with the swinging lower limb was small when applying the tape. Other factors besides balance or proprioception of the supporting limb (affected limb) may have influenced the test outcome. When considering the supporting limb, the resistance to quadriceps muscle fatigue may be one of the factors influencing the test result [16]. Additionally, when considering the swinging lower limb, various other aspects reported in previous literature that could have been influential, such as the hip's range of motion, the elasticity of the rectus, the quadriceps and psoas iliacus during posterior movements, or the abductor muscles during abduction, were not evaluated in present study [16]. The improvement in dynamic balance could possibly be attributed to the reduction in pain after correcting positional faults. One of the causes of pain and discomfort in patients with plantar fasciitis is overpronation of the foot and flattening of the medial arch, which places excessive stress on the plantar fascia during weight-bearing activities [17,18]. Mulligan calcaneal taping supports the calcaneus, reducing a significant amount of stress and thereby reducing the compressive load on the plantar fascia. This leads to less irritation, reduced inflammation, better healing of microtears, and ultimately a reduction in pain, providing better stability [10]. It is also associated with the decreased arch and rotational component of the calcaneus, which can be corrected with Mulligan's calcaneal taping as it focuses on correcting faulty biomechanics of the rearfoot [19]. By taping the calcaneus into external rotation and adduction, excessive pronation of the rearfoot can be prevented, maintaining a more neutral position. This reduces the force on the plantar fascia, and the glide is maintained due to the rigid tape [19].

The difference in the FFI between both groups did not show a statistically significant result. However, when the effect size was estimated, it showed a significant difference in Cohen's d, which is considered to have large clinical significance (d=0.816). In this study, subjects with pronated feet in the FFI were included, which led to a significant reduction in the pain domain of the foot. However, when considering the disability and activity limitation domain, there was no statistically significant change as these may require a longer period of treatment for improvement in pronated feet.

Foot core exercises included in the protocol along with taping help enhance proprioceptive feedback, enabling individuals to make small adjustments in their posture and movement to effectively maintain balance. Strengthening these muscles through specific exercises such as toe curls, foot doming, and toe spreads not only improves foot muscle strength but also stabilises the arch's structure, further enhancing overall foot stability [20-22]. The purpose of the plantar fascia stretch was to improve the tension in the fascia by applying a sustained stretch to the fascia, recreating the mechanism of the windlass, and reducing microtrauma and inflammation associated with plantar fasciitis [22-24]. The improvement in fascial tension due to stretching may have also helped in relieving pain, along with taping,

caused by plantar fasciitis. This is supported by a previous study stating that performing stretching of the plantar fascia and Achilles tendon has been effective in reducing pain in the plantar fascia [22].

Furthermore, with taping intervention, exercises targeting the intrinsic foot muscles play an important role in managing balance by restoring functional limitations within the foot and contributing to controlling pronation, thereby supporting gait cycle dynamics and weight-bearing activities [25-27]. The significant differences observed in dynamic balance and the FFI score among participants in group A underscore the efficacy of Mulligan's calcaneal taping with strengthening exercises. Incorporating Mulligan calcaneal taping along with conventional therapy for the management of plantar fasciitis may offer clinicians an additional tool to improve dynamic balance and functional performance. Further studies can be conducted to assess the long-term effects of these interventions for a better understanding of changes. Similar studies can be conducted to assess the effects of these interventions on the strength of the intrinsic muscles of the foot and changes in lower limb kinematics.

Limitation(s)

The two-week intervention period could have limited the effectiveness of the intervention being studied.

CONCLUSION(S)

Mulligan's calcaneal taping, along with conventional physiotherapy, has significantly improved dynamic balance in the medial, posterior, and posteromedial directions. Other directions did not showed statistical significance, but clinical significance was noted, except for the posterolateral direction. The reason for this could be the two-week intervention. Additionally, functional performance did not showed any statistical difference, with only clinical significance observed in subjects with plantar fasciitis.

REFERENCES

[1] Kumar S, Choudhary N, Kumar D, Nair A. To compare the effectiveness of calcaneal taping versus conventional therapy in the treatment of plantar fasciitis. Eur J Mol Clin Med. 2021;7(1):4310-30.
[2] Hyland MR, Webber-Gaffney A, Cohen L, Lichtman SW. Randomized controlled trial of calcaneal taping, sham taping, and plantar fascia stretching for the short-term management of plantar heel pain. J Orthop Sports Phys Ther. 2006;36(6):364-71.
[3] Trojian T, Tucker AK. Plantar fasciitis. Am Fam Physician. 2019;99(12):744-50.
[4] Petraglia F, Ramazzina I, Costantino C. Plantar fasciitis in athletes: Diagnostic and treatment strategies. A systematic review. Muscles, Ligaments, and Tendons Journal. 2017;7(1):107.
[5] Welte L, Kelly LA, Lichtwark GA, Rainbow MJ. Influence of the windlass mechanism on arch-spring mechanics during dynamic foot arch deformation. J R Soc Interface. 2018;15(145):20180270.
[6] de Morais Barbosa C, Barros Bértolo M, Marques Neto JF, Bellini Coimbra I, Davitt M, de Paiva Magalhães E. The effect of foot orthoses on balance, foot pain and disability in elderly women with osteoporosis: A randomized clinical trial. Rheumatology. 2013;52(3):515-22.
[7] Crosby W, Humble RN. Rehabilitation of plantar fasciitis. Clinics in Podiatric Med Sur. 2001;18(2):225-31.
[8] Genova JM, Gross MT. Effect of foot orthotics on calcaneal eversion during standing and treadmill walking for subjects with abnormal pronation. J Orthop Sports Phys Ther. 2000;30(11):664-75.
[9] Shama SS, Kominsky SJ, Lemont H. Prevalence of non-painful heel spur and its relation to postural foot position. Journal of the American Podiatry Association. 1983;73(3):122-23.
[10] Aishwarya NC, Sai KV. Immediate effect of calcaneal taping versus windlass taping on calcaneal angle in subjects with plantar fasciitis. Int J Ther Appl. 2016;33:28-32.
[11] Koc Jr TA, Bise CG, Neville C, Carreira D, Martin RL, McDonough CM. Heel Pain-Plantar Fasciitis: Revision 2023: Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability and Health from the Academy of Orthopaedic Physical Therapy and American Academy of Sports Physical Therapy of the American Physical Therapy Association. J Orthop Sports Phys Ther. 2023;53(12):CPG1-39.
[12] Gribble PA, Hertel J, Plisky P. Using the star excursion balance test to assess dynamic postural-control deficits and outcomes in lower extremity injury: A literature and systematic review. J Athl Train. 2012;47(3):339-57.
[13] Bressel E, Yonker JC, Kras J, Heath EM. Comparison of static and dynamic balance in female collegiate soccer, basketball, and gymnastics athletes. J Athl Train. 2007;42(1):42-46. PMID: 17597942; PMCID: PMC1896078.
[14] Budiman-Mak E, Conrad KJ, Roach KE. The foot function index: A measure of foot pain and disability. J Clin Epidemiol. 1991;44(6):561-70.
[15] Page P. Beyond statistical significance: Clinical interpretation of rehabilitation research literature. Int J Sports Phys Ther. 2014;9(5):726.
[16] Chamorro-Moriana G, Perez-Cabezas V, Benitez-Lugo M. Effectiveness of functional or biomechanical bandages with athletic taping and kinesiotaping in subjects with chronic ankle instability: A systematic review and meta-analysis. EFORT Open Reviews. 2024;9(2):94-106.
[17] Ayub A, Yale SH, Bibbo C. Common foot disorders. J Clin Med Res. 2005;3(2):116-19.
[18] Wearing SC, Smeathers JE, Sullivan PM, Yates B, Urry SR, Dubois P. Plantar fasciitis: Are pain and fascial thickness associated with arch shape and loading? Physical Therapy. 2007;87(8):1002-08.
[19] Kwong PK, Kay D, Voner RT, White MW. Plantar fasciitis. Mechanics and pathomechanics of treatment. Clin Sports Med. 1988;7(1):119-26.
[20] Kim HJ, Cho J, Lee S. Talonavicular joint mobilization and foot core strengthening in patellofemoral pain syndrome: A single-blind, three-armed randomized controlled trial. BMC Musculoskeletal Disorders. 2022;23(1):150.
[21] Digiovanni BF, Nawoczenski DA, Malay DP, Graci PA, Williams TT, Wilding GE, et al. Plantar fascia-specific stretching exercise improves outcomes in patients with chronic plantar fasciitis: A prospective clinical trial with two-year follow-up. JBJS. 2006;88(8):1775-81.
[22] Cole C, Seto C, Gazewood J. Plantar fasciitis: Evidence-based review of diagnosis and therapy. Am Fam Physician. 2005;72(11):2237-42.
[23] Ross M. Use of the tissue stress model as a paradigm for developing an examination and management plan for a patient with plantar fasciitis. J Am Podiatr Med Assoc. 2002;92(9):499-506.
[24] Banerjee G, Briggs M, Johnson MI. The effects of kinesiology taping on experimentally-induced thermal and mechanical pain in otherwise pain-free healthy humans: A randomised controlled repeated-measures laboratory study. PLoS One. 2019;14(12):e0226109.
[25] MacGregor K, Gerlach S, Mellor R, Hodges PW. Cutaneous stimulation from patella tape causes a differential increase in vasti muscle activity in people with patellofemoral pain. J Orthop Res. 2005;23(2):351-58.
[26] Ferrari E, Cooper G, Reeves ND, Hodson-Tole EF. Intrinsic foot muscles act to stabilise the foot when greater fluctuations in centre of pressure movement result from increased postural balance challenge. Gait Posture. 2020;79:229-33.
[27] Buchbinder R. Plantar fasciitis. N Engl J Med. 2004;350(21):2159-66.

PARTICULARS OF CONTRIBUTORS:
1. Undergraduate Student, School of Physiotherapy, D.Y. Patil (Deemed to be University), Navi Mumbai, Maharashtra, India.
2. Associate Professor, School of Physiotherapy, D.Y. Patil (Deemed to be University), Navi Mumbai, Maharashtra, India.
3. Associate Professor, School of Physiotherapy, D.Y. Patil (Deemed to be University), Navi Mumbai, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Riddhi Ashish Shroff,
Associate Professor, School of Physiotherapy, D.Y. Patil (Deemed to be University), Navi Mumbai, Maharashtra, India.
E-mail: riddhi.shroff@dypatil.edu

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Apr 12, 2024
- Manual Googling: May 09, 2024
- iThenticate Software: Jun 17, 2024 (17%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Apr 12, 2024**
Date of Peer Review: **May 01, 2024**
Date of Acceptance: **Jun 18, 2024**
Date of Publishing: **Aug 01, 2024**