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EFFECTIVENESS OF MYOFACIAL RELEASE VS ULTRASOUND FOR PAIN RELIEF AND FUNCTIONAL IMPROVEMENT IN COMPUTER WORKERS WITH TRAPEZIUS MYALGIA

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ABSTRACT

Background: Trapezius myalgia is a common work-related musculoskeletal disorder among computer workers, caused by prolonged static postures and repetitive upper-limb activity, leading to pain, stiffness, and reduced function. Myofascial Release (MFR) and Ultrasound Therapy (UST) are frequently used physiotherapy interventions, yet limited evidence directly compares their effectiveness in this population.
Objective: To compare the effectiveness of Myofascial Release and Ultrasound Therapy in reducing pain and improving functional outcomes in computer workers with trapezius myalgia.
Methods: Forty computer workers aged 25–45 years clinically diagnosed with trapezius myalgia were randomly allocated into two groups: Group A received Myofascial Release (2 sessions/week), and Group B received Ultrasound Therapy (3 sessions/week) for six weeks. Both groups received conventional exercise therapy. Pain intensity (NPRS) and functional disability (NDI) were assessed pre- and post-intervention. Data were analyzed using paired and independent t-tests with significance set at $p < 0.05$.
Results: Both interventions produced statistically significant improvements in NPRS and NDI scores within groups ($p < 0.001$). However, between-group comparisons showed no significant difference for NDI ($p = 0.38$) or NPRS ($p = 0.43$), indicating comparable effectiveness.
Conclusion: MFR and UST are both effective in reducing pain and disability in computer workers with trapezius myalgia. MFR demonstrated slightly greater clinical improvement, though not statistically significant. Larger studies with long-term follow-up are recommended.
Keywords: trapezius myalgia, myofascial release, ultrasound therapy, computer workers, neck pain, disability

INTRODUCTION

Trapezius myalgia (TM) is one of the most common work-related musculoskeletal disorders affecting computer workers, arising from prolonged static postures, repetitive upper-limb activity, and sustained low-level muscle contraction of the upper trapezius during desk work. This repetitive overload leads to increased muscle tension, fatigue, and the formation of myofascial trigger points (MTrPs), which contribute to localized pain, stiffness, and functional limitations. [1] Electromyographic studies show that individuals with TM demonstrate altered muscle activation patterns and reduced motor variability, indicating neuromuscular dysfunction resulting from sustained occupational loading. [2] Due to the rapid increase in digital and computer-based workplaces, TM poses a growing public health concern and has become a major contributor to reduced productivity, increased absenteeism, and diminished quality of life among office workers. [3]

Myofascial trigger points in the upper trapezius are considered a hallmark of TM. These hyperirritable nodules within taut muscle bands generate pain, restrict neck-shoulder mobility, and often refer pain to adjacent regions such as the cervical spine and scapular area. Persistent trigger points can lead to adaptations in posture, including forward-head posture and rounded shoulders, further perpetuating the cycle of pain and dysfunction. [4] Because most computer workers adopt a sustained, seated posture with elevated shoulder tension, the upper trapezius becomes highly susceptible to ischemia, metabolic stress, and microtrauma all of which increase the risk of developing TM. This intricate relationship between ergonomics, muscle physiology, and neuromuscular control underscores the need for targeted interventions that address the underlying myofascial dysfunction rather than merely alleviating symptoms. [5]

Among physiotherapeutic treatments, Myofascial Release (MFR) has emerged as a widely practiced manual therapy technique aimed at reducing fascial restrictions, restoring muscle elasticity, and improving local circulation. MFR applies sustained pressure to the fascia and soft tissues, helping reduce muscle stiffness, deactivate trigger points, and improve functional mobility. [6] Evidence suggests that MFR produces immediate and clinically meaningful improvements in pain, cervical ROM, and muscular tension among individuals with TM and other myofascial pain conditions. [7] Its hands-on nature also promotes body awareness and relaxation, potentially addressing both the mechanical and perceptual components of pain.

Therapeutic ultrasound (US), another commonly utilized modality, uses thermal and non-thermal mechanisms to promote tissue healing, reduce muscle spasm, enhance blood flow, improve collagen extensibility, and relieve pain. [8] Several randomized controlled trials have demonstrated that ultrasound significantly reduces pain intensity, improves pressure pain threshold, and decreases palpable muscle tightness in patients with upper trapezius MTrPs. The modality's capacity to induce deep heating makes it particularly useful in treating chronic myofascial pain, where increased tissue pliability is essential for restoring normal muscle length and function. [9]

However, despite the widespread use of MFR and US in clinical practice, there is limited direct comparison of their effectiveness specifically in computer workers a high-risk population due to prolonged workplace exposure. Most previous studies either compared MFR with stretching, TENS, or multimodal therapy, or evaluated ultrasound in isolation rather than against manual techniques. [7,9,10] There remains insufficient evidence regarding which intervention offers greater improvement in pain, muscle tension, and functional outcomes in individuals whose symptoms are directly associated with occupational computer use. Considering the distinct mechanisms of action MFR targeting soft-tissue restrictions mechanically and US targeting tissues through thermal/non-thermal physiological effects a comparative evaluation is essential for evidence-based clinical decision-making.

Furthermore, addressing TM in computer workers requires interventions that are not only effective but also easily applicable in routine clinical settings. Understanding the comparative impact of MFR and US on pain reduction, functional mobility, and occupational performance may help clinicians tailor treatment plans more efficiently. Since ergonomic modifications alone are often insufficient for managing established myofascial pain, identifying the most effective physiotherapy technique can play a crucial role in long-term symptom control and prevention of recurrence. [11] By determining which intervention provides superior outcomes, this

study aims to guide therapists in delivering targeted and cost-effective treatment strategies for modern sedentary workforce populations.

Therefore, the present study aims to compare the effectiveness of Myofascial Release versus Ultrasound therapy in reducing pain and improving functional outcomes in computer workers with Trapezius myalgia. The primary objective of this study is to compare the effectiveness of Myofascial Release (MFR) and Ultrasound Therapy (UST) in reducing pain intensity among computer workers with trapezius myalgia. The secondary objectives include evaluating their effects on functional disability using the Neck Disability Index (NDI), assessing changes in trigger-point sensitivity through pressure pain threshold measurements, examining improvements in cervical range of motion, and determining the short-term effectiveness of both interventions over a defined treatment period.

METHODOLOGY

This study was an experimental comparative study conducted to evaluate the effectiveness of Myofascial Release (MFR) and Ultrasound Therapy (UST) on pain relief and functional improvement in computer workers clinically diagnosed with trapezius myalgia. The study was carried out at Bopal Physiotherapy Clinic and Recovery Plus Physio Clinic. The total study duration was six weeks. Participants were selected using a simple random sampling technique, and the target population consisted of computer professionals diagnosed with trapezius myalgia. A total of 40 participants were included in the study and were equally divided into two groups, with 20 participants receiving Myofascial Release (Group A) and 20 participants receiving Ultrasound Therapy (Group B).

Inclusion Criteria

- Computer workers aged 25 - 45 years
- Diagnosed with trapezius myalgia based on clinical signs and palpation
- NPRS score ≥ 4 for at least 2 weeks
- Willing to participate and follow the treatment protocol
- No ongoing physiotherapy treatment

Exclusion Criteria

- Cervical radiculopathy or neuropathy
- History of trauma, surgery, or fibromyalgia
- Pregnancy
- Severe postural abnormalities (e.g., scoliosis)
- Systemic illness (e.g., diabetes, arthritis)
- Unwilling or uncooperative participants

Outcome Measures

1. **Numeric Pain Rating Scale (NPRS):** For subjective pain intensity.
2. **Neck Disability Index (NDI):** For functional limitation assessment.

Intervention Protocol

All participants were initially instructed in Conventional Therapy & Home-care Guidelines, followed by group-specific interventions.

1. Conventional Exercise Therapy (Both Groups)

Conventional therapy focused on postural correction, stretching, and strengthening exercises for the neck and shoulder region.

The participants were instructed to follow specific self-care guidelines to support recovery. They were advised to take short micro breaks every 30–45 minutes, perform stretching exercises twice daily, and maintain an upright sitting posture with proper shoulder retraction. The use of ergonomically aligned chairs and correct monitor height was encouraged. They were also advised to avoid prolonged forward head posture, carrying heavy bags on one shoulder, sleeping without adequate head support, and using high pillows or sleeping in a prone (stomach-lying) position.

Conventional exercises Protocol: (Performed 5 days/week for 6 weeks) [12]

Convention Exercises	Repetitions	Hold	Sets	Instructions
Upper trapezius stretches	3 per side	30 sec	3	Tilt head sideways, pull gently
Levator scapulae stretch	3 per side	30 sec	3	Turn head 45°, tilt and pull
Shoulder shrugs	15 reps	-	3	Elevate shoulders & release slowly
Scapular retraction (isometric)	10 reps	10 sec	3	Squeeze shoulder blades together
Neck retraction (chin tuck)	15 reps	5 sec	3	Gently tuck chin while keeping spine straight

2. Myofascial Release Therapy (Group A) [13]

Frequency: 2 sessions/week for 6 weeks

Duration: 15–20 minutes/session

Patient Position: Supine or seated relaxed

Therapist Technique**:**

- Gentle skin-rolling and sustained pressure applied to the upper trapezius muscle
- Use of cross-hand stretch technique or trigger-point release
- Mild-to-moderate pressure applied until tissue resistance is felt
- Hold for 90 - 120 seconds, then slowly release
- Repeat for 3 - 5 cycles on each side

Precautions

- Avoid overly aggressive pressure
- Monitor patient comfort
- Avoid treatment if signs of acute inflammation or infection are present

3. Ultrasound Therapy (Group B) [14]

Device Settings

- Frequency: 1 MHz (for deep tissue)
- Intensity: 1.0–1.5 W/cm²
- Mode: Continuous
- Duration: 8–10 minutes/session
- Frequency of treatment: 3 days/week for 6 weeks

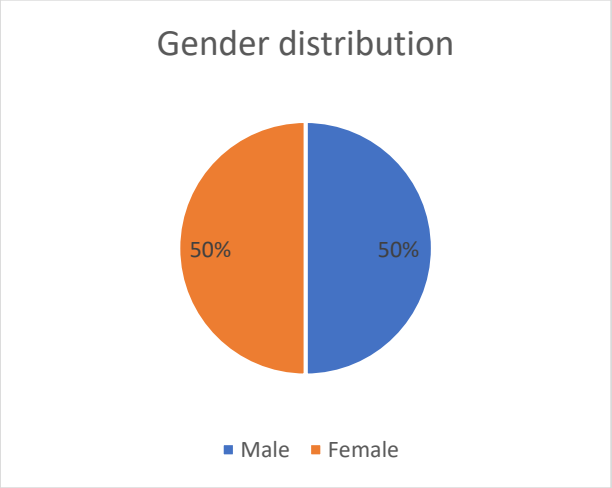
Application Procedure

- Patient Position: Seated or prone with relaxed shoulder
- Apply coupling gel over upper trapezius region
- Use circular motions with transducer head
- Cover entire area of muscle spasm or trigger point
- Observe for any skin irritation or discomfort

Statistical Analysis: Data analyzed using appropriate statistical software. Descriptive statistics (mean and standard deviation) used for NPRS and NDI scores. Paired t-tests used for within-group comparison, and independent t-tests used for between-group comparison. A p-value < 0.05 considered statistically significant.

RESULTS

Chart 1: Gender Distribution:



The study consisted of 40 clinically diagnosed Computer Workers with Trapezius Myalgia, evenly divided into 20 male and 20 female participants.

Table 1: No. of Participants according to Age

Age	No. of participants
25–30	8
31–35	12
36–40	14
41–45	6

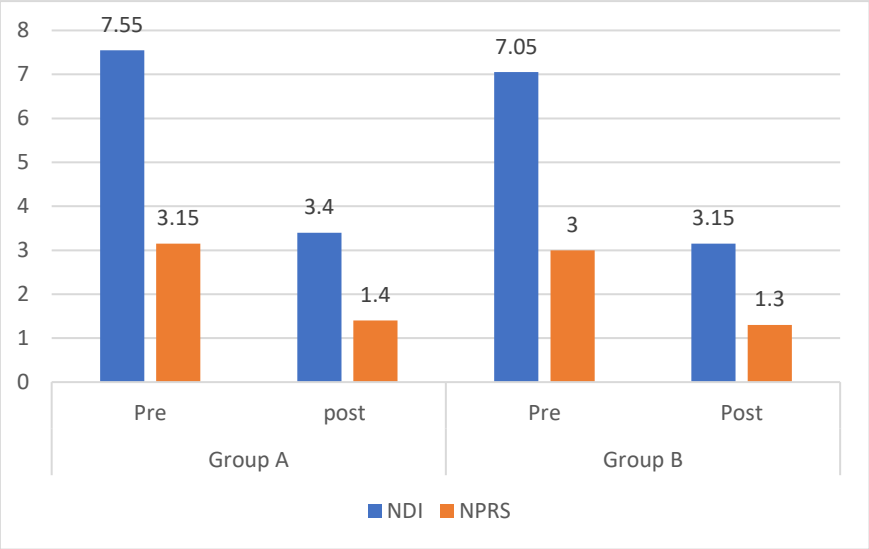
Most participants were in the 36 - 40 years age group (14 participants), followed by the 31–35 years group (12 participants). Fewer participants were in the 25 - 30 years (8 participants) and 41–45 years (6 participants) age groups, indicating that the majority of the study population was between 31 and 40 years of age.

Table 2: Comparison of NDI and NPRS Scores Between Groups

Outcome	Group	Pre (Mean ± SD)	Post (Mean ± SD)	Mean Difference	Within-group p-value	Between-group p-value
NDI	A	7.55 ± 4.90	3.40 ± 2.73	4.15 ± 2.37	< 0.001	0.38
	B	7.05 ± 4.72	3.15 ± 2.03	3.90 ± 2.74	< 0.001	
NPRS	A	3.15 ± 1.46	1.40 ± 0.58	1.75 ± 0.99	< 0.001	0.43
	B	3.00 ± 1.26	1.30 ± 0.46	1.70 ± 0.90	< 0.001	

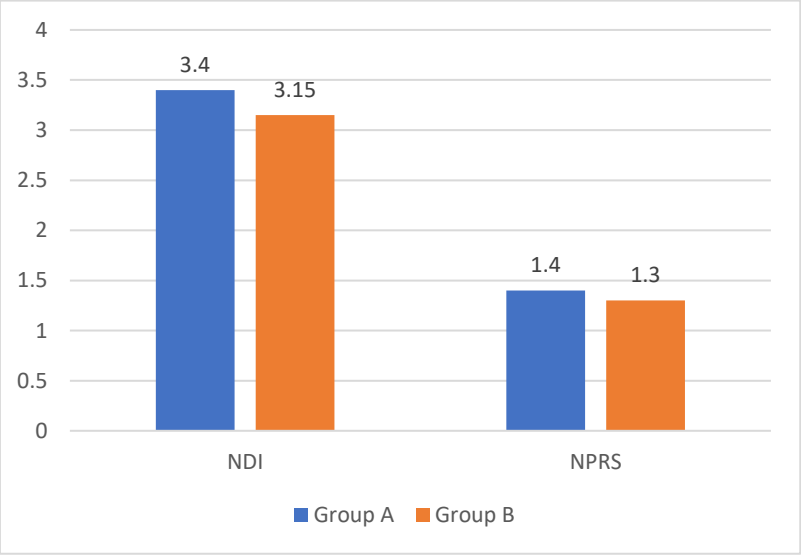
Both Group A and Group B showed a statistically significant improvement in NDI and NPRS scores after intervention ($p < 0.001$). However, there was no significant difference between the two groups for NDI ($p = 0.38$) or NPRS ($p = 0.43$), indicating that both treatments were equally effective in reducing neck disability and pain.

Chart 2: Comparison of Pre- and Post-Intervention Scores in Group A and Group B



Both Group A and Group B showed a clear reduction in NDI and NPRS scores from pre to post treatment, indicating improvement in neck disability and pain. The improvements were similar in both groups, suggesting that both interventions were effective.

Chart 3: Between-Group Comparison of NDI and NPRS Scores (Group A vs Group B)



Both groups showed similar post-intervention outcomes. Group B had slightly lower NDI and NPRS scores than Group A, indicating marginally better improvement, but the difference between the groups was minimal.

DISCUSSION

The present study compared the effectiveness of Myofascial Release (MFR) and Ultrasound Therapy (UST) in reducing pain and disability among computer workers diagnosed with trapezius myalgia. A total of 40 participants were included, with equal gender distribution (20 males and 20 females) and a predominant representation in the age range of 31–40 years. Both groups were comparable at baseline in terms of Neck Disability Index (NDI) and Numeric Pain Rating Scale (NPRS), ensuring the validity of subsequent comparisons.

The outcome analysis demonstrated statistically significant improvements within both groups following six weeks of intervention ($p < 0.001$). For NDI, Group A (MFR) showed a mean reduction of 4.15 points (from 7.55 ± 4.90 to 3.40 ± 2.73), while Group B (UST) improved by 3.90 points (from 7.05 ± 4.72 to 3.15 ± 2.03). Similarly, in NPRS, Group A demonstrated a mean reduction of 1.75 points (from 3.15 ± 1.46 to 1.40 ± 0.58), and Group B showed a reduction of 1.70 points (from 3.00 ± 1.26 to 1.30 ± 0.46). Between-group analysis,

however, revealed no statistically significant differences ($p > 0.01$), although Group A consistently exhibited slightly greater improvement in both disability and pain reduction compared to Group B.

The superior outcomes in the MFR group may be attributed to its underlying mechanisms, which include the release of fascial restrictions, modulation of nociceptive input, enhancement of circulation, and reduction in muscle guarding. These physiological effects promote improved mobility, tissue pliability, and neuromuscular relaxation. **Ajmsha et al. (2014)** have also reported similar findings, showing that MFR is effective in reducing pain and improving functional status in musculoskeletal conditions. [15] The present study aligns with this evidence, suggesting that MFR may hold a modest clinical advantage over UST in the management of trapezius myalgia. Ultrasound Therapy, in contrast, exerts its therapeutic benefits primarily through thermal and non-thermal mechanisms, leading to increased blood flow, enhanced cell permeability, and accelerated tissue healing. While UST was also effective in the present study, the comparatively lower degree of improvement in NDI and NPRS is consistent with previous findings by **Borman et al. (2003),** who highlighted that although UST provides symptomatic relief, manual therapy techniques such as MFR may lead to superior functional outcomes when applied as stand-alone interventions. [16]

The results also correspond with **Aguilera et al. (2009)** [17], who found that manual pressure-based techniques produced immediate superior reductions in upper trapezius trigger-point sensitivity compared to ultrasound, suggesting that direct mechanical input to soft tissues may modulate nociception more efficiently. Recent comparative trials, such as those by **Yadav et al. (2021)** [18] and **Sharma et al. (2020)** [19], further support this pattern, showing that MFR or similar manual approaches result in greater improvements in pain, cervical ROM, and disability indices than ultrasound or phonophoresis alone. Another related study by **Kjaer et al. (2016)** [20] examining chronic neck pain also emphasized that interventions targeting soft-tissue mobility and neuromuscular relaxation produce more sustained functional outcomes when compared to modality-based treatments, which is consistent with the present study's findings.

The underlying mechanisms may explain these differences, MFR works by reducing fascial tension, improving soft-tissue extensibility, enhancing circulation, and modulating pain through both mechanical and neurophysiological pathways. These effects not only reduce pain but also improve functional movement patterns, which may contribute to the superior NDI and NPRS outcomes observed in the MFR group. [7] In contrast, UST exerts its benefits mainly through thermal and non-thermal effects that enhance tissue healing and circulation, but may not address deeper fascial restrictions as effectively. [9] This mechanistic difference is reflected in previous literature, including the systematic review by **Qing et al. (2021) [21],** which concluded that ultrasound is effective for short-term pain reduction but shows variable impact on disability outcomes, reinforcing the present study's observation that UST was beneficial but slightly less impactful than MFR.

Despite strengths such as balanced gender distribution, adequate sample size, and validated outcome measures, this study has limitations. The sample size may not have been sufficient to detect small between-group differences, and the lack of long-term follow-up prevents understanding of whether improvements persist beyond six weeks. These limitations are common in comparative studies of MFR and UST, highlighting the need for larger, long-term trials. Still, the study supports existing evidence that while UST effectively reduces pain but MFR may provide slightly greater improvements in both pain and function among computer users with trapezius myalgia.

CONCLUSION

Both Myofascial Release (MFR) and Ultrasound Therapy (UST) effectively reduced pain and disability in computer workers with trapezius myalgia, as evidenced by significant improvements in NDI and NPRS scores. Although the difference between groups was not statistically significant, MFR showed a slightly greater clinical benefit, likely due to its direct influence on fascial restrictions and soft tissue mobility. Overall, MFR may offer a more favorable therapeutic option for managing trapezius myalgia. Future studies with larger samples and long-term follow-up are recommended to validate these findings.

REFERENCES

1. Yildirim MA, Ones K, Goksanoglu G. Effectiveness of ultrasound therapy on myofascial pain syndrome of upper trapezius: randomized, single-blind, placebo-controlled study. Arch Rheumatol. 2018;33(4):418-23.
2. Larsson SE, et al. Muscle activity and motor variability in trapezius myalgia. Int Arch Occup Environ Health. 2001;74(1):64-70.
3. Mehrparvar AH, et al. Upper extremity and neck pain in office workers: prevalence and risk factors. Work. 2019;62(1):137-43.
4. Kwon JW, et al. Forward head posture and myofascial pain: correlation with muscle imbalance. J Phys Ther Sci. 2015;27(6):1851-4.
5. Hanvold TN, et al. Computer work exposure and risk of muscular pain. Appl Ergon. 2013;44(4):521-8.
6. Barnes JF. Myofascial release: the search for excellence. Therapy Review. 1990;2:35-42.
7. Joshi A, Jawade S, Chitale N. Effectiveness of myofascial release vs high-frequency TENS for trapezius myalgia. J Pharm Res Int. 2021;33:352-8.
8. Robertson VJ, et al. Physiological effects of therapeutic ultrasound. Phys Ther. 2001;81(7):1351-8.
9. Yildiz TI, et al. Ultrasound therapy for myofascial trigger points of upper trapezius: RCT. J Back Musculoskelet Rehabil. 2019;32(4):543-9.
10. Llamas-Ramos R, et al. Comparison of manual therapy and electrotherapy in MTrPs. Clin J Pain. 2014;30(3):233-40.
11. da Costa BR, Vieira ER. Risk factors for work-related musculoskeletal disorders in office workers. BMC Musculoskelet Disord. 2010;11:79.
12. Kisner C, Colby LA. Therapeutic Exercise: Foundations and Techniques. 6th ed. Philadelphia: F.A. Davis; 2012.
13. Barnes JF. The basic science of myofascial release: morphologic change in connective tissue. J Bodyw Mov Ther. 1997;1(4):231-8.
14. Kitchen S, Partridge CJ. Ultrasound in Physiotherapy. 2nd ed. Edinburgh: Churchill Livingstone; 1991.
15. Ajimsha MS, Al-Mudahka NR, Al-Madzhar JA. Effectiveness of myofascial release: systematic review of randomized controlled trials. J Bodyw Mov Ther. 2014;18(3):386-400. doi:10.1016/j.jbmt.2013.11.006.
16. Borman P, Keskin D, Bodur H, Ozdemir Y, Akinci A, Kuran B. The efficacy of ultrasound therapy in patients with chronic low back pain. Rheumatol Int. 2003;23(2):89-93. doi:10.1007/s00296-002-0247-x.
17. Yadav V, Goyal M, Verma S. Comparative effectiveness of myofascial release versus ultrasound therapy in patients with upper trapezius myofascial pain. Indian J Physiother Occup Ther. 2021;15(2):87-92.
18. Sharma S, Kage V. Comparison between myofascial release and phonophoresis for reducing pain and improving neck function in trapezius myalgia: a randomized clinical trial. Int J Health Sci Res. 2020;10(6):200-6.
19. Aguilera FJ, Martín DP, Masanet RA, Botella AC, Soler LB, Morell FB. Immediate effect of ultrasound and ischemic compression techniques for treating trapezius myofascial trigger points: a randomized controlled trial. J Manipulative Physiol Ther. 2009;32(7):515-20.
20. Kjaer P, Kongsted A, Hartvigsen J. Neck pain: clinical course and management recommendations. Chiropr Man Therap. 2016;24:1-12.
21. Qing C, Zhang Q, Gong Y, Sun W. Effectiveness of therapeutic ultrasound in patients with neck pain: a systematic review and meta-analysis. Physiother Theory Pract. 2021;37(7):801-12.