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Original Article

The Effect of Intradermal Injection with Two Different Injection Techniques on Pain and Functional Status in Patients with Chronic Nonspecific Neck Pain

Kronik Non-Spesifik Boyun Ağrılı Hastalarda İki Farklı Enjeksiyon Teknikle Uygulanan İntradermal Enjeksiyonun Ağrı ve Fonksiyonel Durum Üzerine Etkisi

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ABSTRACT

Objective: This study aimed to compare the effectiveness of different mesotherapy techniques applied at various dermal depths on pain, functional status, and quality of life in patients with non-specific neck pain.

Methods: A total of 43 patients who received mesotherapy for non-specific neck pain were retrospectively analyzed. Patients treated with the point-by-point technique (n=21) and the napaj technique (n=22) were recorded. A mixture of 2 mL lidocaine and tenoxicam was used as the mesotherapy solution. Pain was assessed using the visual analog scale (VAS), functional status was assessed using the neck disability index (NDI), and quality of life was assessed using the Nottingham health profile before (T0), after (T1), and 3 months after (T2).

Results: In both groups, which were homogeneous in terms of demographic data, statistically significant changes were observed in T1 and T2 values compared with T0 for all evaluation parameters (p=0.001). While both groups demonstrated improvement in all parameters, the posttreatment VAS and NDI score in the point-by-point group was slightly better than that in the napaj group (p=0.042), (p=0.043) but this difference disappeared in the 3-month evaluation.

Conclusions: Mesotherapy using a lidocaine-tenoxicam mixture with both the point-by-point and napaj techniques is an effective and safe treatment method for nonspecific neck pain. Both techniques were found to be effective in improving pain, functional status, and quality of life, but neither technique was found to be superior to the other.

Keywords: Intradermal injection, mesotherapy, neck pain, point by point, napaj

ÖZ

Amaç: Bu çalışmanın amacı, non-spesifik boyun ağrısı olan hastalarda, farklı dermal derinliklerde uygulanan farklı mezoterapi tekniklerinin ağrı, fonksiyonel durum ve yaşam kalitesi üzerindeki etkinliğini karşılaştırmaktır.

Yöntemler: Non-spesifik boyun ağrısı nedeniyle mezoterapi uygulanan 43 hasta retrospektif olarak incelendi. Teknik olarak Point by point (n=21) ve napaj (n=22) tekniği ile mezoterapi uygulan hastalar kaydedildi. Mezoterapi solüsyonu olarak 2 mL lidokain ve tenoksikamdan hazırlanan karışım uygulandı. Hastaların ağrısı görsel analog skala (VAS), fonksiyonel durumu boyun engellilik indeksi (BDI) ve yaşam kalitesi Nottingham sağlık profili (NSP) kullanılarak tedavi öncesi (T0), tedavi sonrası (T1) ve tedaviden 3 ay sonra (T2) değerlendirildi.

Bulgular: Demografik veriler açısından homojen olan her iki grupta tüm değerlendirme parametrelerinde T0'a göre T1 ve T2 değerlerinde istatistiksel olarak anlamlı değişiklikler gözlendi (p=0.001). Her iki grupta tüm parametrelerde iyileşme gözükürken point by point grubunda tedaviden sonraki VAS (p= 0.042) ve BDI (p= 0.043) değeri napaj grubuna göre küçük bir farkla daha iyi olduğu fakat bu farkın 3. aydaki değerlendirmede ortadan kalktığı görüldü.

Sonuçlar: Point by point ve napaj tekniği ile lidokain ve tenoksikam karışımında oluşan mezoterapi uygulaması, non-spesifik boyun ağrılarında etkili ve güvenli bir tedavi yöntemidir. Her iki teknik ağrı, fonksiyonel durum ve yaşam kalitesi üzerine etkili ancak birbirlerine üstün bulunmadı.

Anahtar kelimeler: İntradermal enjeksiyon, mezoterapi, boyun ağrısı, point by point, napaj

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INTRODUCTION

According to the Guidelines on Neck Pain, neck pain is defined as an uncomfortable sensory and emotional experience connected to actual or potential damage to the tissues in the neck, extending from the superior nuchal line to the level of the scapula[1]. Non-specific neck pain refers to discomfort occurring in the side and back areas of the neck, in the absence of neurological and specific pathologies, such as fractures, infections, inflammation, or cervical spondylosis[2]. Neck pain affects between 10% and 21% of people annually, with approximately 5-10% of cases becoming chronic. It is one of the most common reasons for primary healthcare consultations and is the fourth leading cause of disability worldwide[3-5]. Neck pain has significant implications for treatment because it can reduce quality of life, decrease work productivity, limit daily activities, and increase healthcare costs[4]. The causes of neck pain are often multifactorial, predominantly arising from musculoskeletal issues. Risk factors include lack of physical activity, prolonged computer use, stress, and female sex, which involve both physical and psychological aspects[4,5].

Treatment for non-specific neck pain involves both pharmacological and nonpharmacological approaches. Non-pharmacological methods include education, physical therapy modalities, exercise, cognitive behavioral treatment, and cervical collar use. Pharmacological treatments often include pain relievers, muscle relaxants, steroids, narcotic analgesics, and antidepressants. Among the pharmacological treatments, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) are most commonly prescribed for pain management. However, the use of these drugs, particularly in the elderly or in patients with comorbidities and multiple medications, can lead to significant complications, including drug interactions and life-threatening effects on the gastrointestinal, cardiovascular, and renal systems[1-3]. To minimize such complications, local pharmacological therapies (e.g., interventional procedures, intra-articular or peri-articular injections) can be convenient alternatives[1,2]. One of the effective and safe methods for treating localized musculoskeletal pain, including neck and lower back pain, is local intradermal therapy (mesotherapy)[6].

Mesotherapy is a minimally invasive technique, involves injecting a mixture of compounds (such as herbal extracts, homeopathic agents, medications, vitamins, and other bioactive substances) intradermally or subcutaneously using very fine needles in small doses[7]. Initially described by Michel Pistor in 1958, monotherapy has become a widely known and practiced technique in various parts of the world for treating localized clinical conditions[8,9].

Clinical studies have shown that intradermal injections in monotherapy allow lower doses of drugs to remain in target tissues (skin, muscle, and joint) for longer periods than intramuscular injections. This method alters the absorption kinetics of the injected drug, thereby slowing its systemic absorption and enabling its local distribution in underlying tissues. The benefits of this technique include reduced drug doses, less frequent application, a lower risk of drug interactions in patients taking multiple medications, and the ability to combine monotherapy with other pharmacological and non-pharmacological approaches. These advantages have made monotherapy a widely used method worldwide[8-10].

In pain monotherapy, a 4- mm needle (27-30 gauge) is typically used, and the technique is applied either by nappage or the point-by-point method. In the point-by-point technique, injections are made perpendicularly to the skin at a depth of 4 mm and spaced 1-2 cm apart. The rappage technique involves more superficial injections at a depth of 2 mm using a 4- mm needle, covering a larger area[7]. In local pain treatment, anesthetics, nonsteroidal anti-inflammatory drugs, and muscle relaxants are commonly injected intradermally either individually or as a mixture at very low doses[9].

In our study, we aimed to retrospectively investigate the effectiveness of two different intradermal injection techniques, nappage and point-by-point injection, using a combination of local anesthetic and NSAIDs, on pain and functional status in patients with chronic nonspecific cervical pain, which is the first study of its kind in the literature.

MATERIALS and METHODS

Study Design

This study retrospectively evaluated the medical records of patients who presented with chronic non-specific neck pain and received monotherapy treatment at the Physical Medicine and Rehabilitation out-patient clinics of Istanbul Medeniyet University Goztepe Prof. Dr. Suleyman Yalcin City Hospital between January 2023 and September 2024.

The study included patients diagnosed with chronic nonspecific neck pain for at least 3 months, based on clinical and radiological assessments, with a Visual Analog Scale (VAS) score of 4 or higher. Patients with fractures, infections, inflammatory pain, cervical spondylosis, and radicular pain, as well as those who underwent neck surgery, were excluded from the study. Patients were randomly selected by considering inclusion and exclusion criteria. Participants were aged 18-65 years and of both

sexes, and they received monotherapy treatment using either nappage or point-by-point technique. This study was approved by the Clinical Research Ethics Committee of Istanbul Medeniyet University of Health Sciences Göztepe Training and Research Hospital (decision no: 2023/0813, date: 29.11.2023).

Mesotherapy Protocol

The monotherapy injection was performed using 2.5 mL sterile syringes (Meso-Relle, Biotekne, Serebellar reticular lesion, Italy) with a 32G x 4 mm needle. A total of 2 mL was prepared by diluting 1 mL of 2% lidocaine (2% Jetmonal, Adeka Pharma Co., Istanbul, Türkiye) was diluted with 1 ml of tenoxicam diluted in saline at a 3:1 ratio (Oksamen 20 mg/4 mL; Nobel Pharma Co., Istanbul, Türkiye). The injections were administered in four sessions, one week apart.

The application area was from the superior nuchal line and continued down to the level of the scapular spine (Figure 1). In patients treated with the point-by-point technique, 0.02 mL to 0.05 mL was injected at a depth of 4 mm, perpendicular to the skin, with intervals of 1-2 cm. In patients receiving the rappage technique, a more superficial injection was performed at a depth of 2 mm, applying light, continuous positive pressure on the piston, at a 45° angle to the skin, and delivering a drop (0.01-0.02 mL) of the solution to each area at short distances. The monotherapy sessions were conducted by an experienced physiatrist.

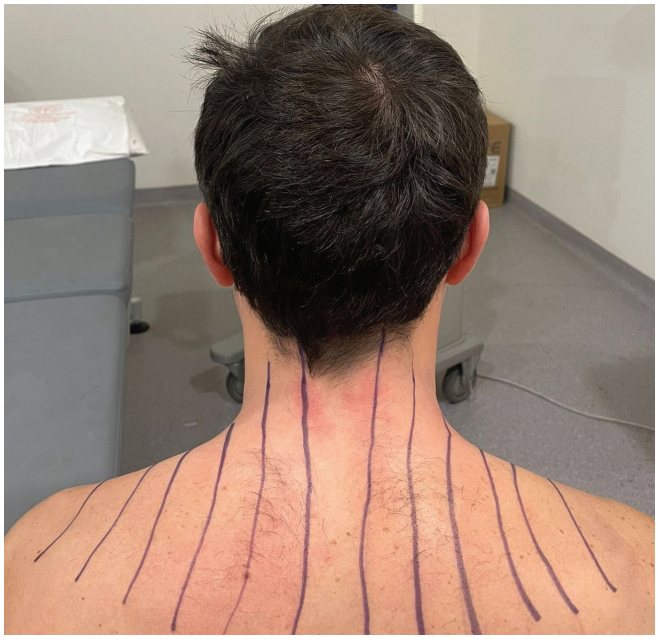

Figure 1: Injection site.

Clinical Evaluation

Demographic data, including age, height, weight, marital status, education status, employment status, and smoking habits, were recorded.

Pain was assessed using the VAS, the impact of neck pain on daily activities was evaluated using the neck disability index (NDI), and quality of life was assessed using the Nottingham Health Profile scales. Patients were evaluated by the same physiatrist (S.M) using the aforementioned scales before treatment (T0), one week post-treatment (T1), and three months after the final follow-up (T2).

VAS: This is a pain assessment tool. The scale ranges from a minimum of 0, indicating no pain, to a maximum of 10, representing the worst pain experienced by the patient[11].

NDI: This is a self-administered questionnaire that assesses how neck pain affects daily activities. The NDI consists of 10 sections, each exploring different aspects of daily life affected by pain (pain intensity; personal care; lifting; reading; headaches; concentration; work; driving; sleeping; recreation). Each section is scored from 0 to 5, where 0 indicates no difficulty or pain and 5 indicates an inability to perform the activity or debilitating pain. The total score ranged from 0 to 50, with higher scores indicating greater disability[12].

Nottingham Health Profile : The NHP is a general quality of life questionnaire that measures an individual's perceived health problems and the extent to which these problems affect routine daily activities. The first section, which assesses six dimensions of health, covers energy, pain, emotional reactions, sleep, social isolation, and physical activity. The second section evaluates areas such as work, housework, home life, sexual life, interests, hobbies, and holidays. Scores for each section ranged from 0 (worst health) to 100 (best health)[13].

Statistical Analysis

Descriptive statistics for the measurements were calculated as mean, standard deviation, median, and 25th and 75th percentiles. The normal distribution of the measured variables was examined using the Shapiro-Wilk test. The relationships between categorical variables were assessed using the Pearson chi-square test. The Mann-Whitney U test was used to compare numerical characteristics between the two groups. Periodic comparisons within each group were performed using the Friedman test and post-hoc Dunn test. The correlation between age, BMI, and VAS scores was analyzed using the

Spearman rank correlation coefficient. A p-value of <0.05 was considered statistically significant. SPSS (ver. 29) was used for all analyses.

Power Analysis

Assessments in the study were conducted using VAS, NDI, and NHP scales. Among these scales, VAS scores were considered the primary out-come. Additionally, based on clinical knowledge and literature[14], a change of 2 points in the VAS score was considered significant. According to this result, Cohen's standardized effect size was accepted as d= 0.90, and alpha= 5% and prior power as 80% indicated that a sample size of at least 20 individuals would be sufficient.

RESULTS

A total of 43 patients were included in the study, with 21 receiving monotherapy using the point-by-point technique and 22 using the rappage technique. There were no significant differences between the two groups in terms of age, BMI, duration of pain, or Beck Depression Scale scores (Table 1. When examining further demographic data of the patients, it was found that 72.1% (n=31) were married, 58.2% (n=25) had a high school education or higher, 53.5% (n=23) were actively working, 34.9% (n=15) were current smokers, and 69.8% (n=30) had no comorbidities. Additionally, 93.0% (n=40) of the patients were female. The analysis of marital status (p=0.206), education level (p=0.614), employment status (p=0.887), smoking (p=0.206), comorbidities (p=0.273), and gender (p=0.578) also showed no significant differences between the two groups. No side effects were observed other than pain during the injection.

Two groups were assessed before, after, and 3 months after the treatment. Significant improvements in VAS and NDI scores were observed in both groups post-treatment, and this improvement was maintained through the third month. When comparing the point-by-point group with the rappage group, the VAS and NDI scores were statistically higher in the rappage group in

Table 1. General characteristics at baseline.

	Treatment	N	Mean	SD	Percentiles			P*
					25th	Median	75th	
Age	Point-by-point	21	47.14	11.38	38.00	46.00	56.00	0.169
	Napaj	22	41.05	14.24	26.00	43.00	51.75	
BMI	Point-by-point	21	26.83	4.47	23.44	26.49	31.45	0.253
	Napaj	22	26.02	6.82	21.84	24.71	28.62	
Pain duration (years)	Point-by-point	20	5.90	5.20	2.25	5.00	7.50	0.929
	Napaj	22	6.50	5.65	2.00	5.00	9.25	
Beck depression scale sor	Point-by-point	21	12.90	8.67	4.50	10.00	19.00	0.473
	Napaj	22	14.64	8.53	6.75	15.00	20.50	

*Mann-Whitney U test (difference between two groups), p<0.05 BMI: Body mass index. SD: standard deviation.

Table 2. VAS and Neck Disability Index comparison

	Point by point(n=21)					Napa j (n=22)					
	Mean	SD	Percentiles			Mean	SD	Percentiles			
			25th	Median	75th			25th	Median	75th	P**
VAS T0	7.9	1.67	8.0	8,00[a]	9.0	7.73	1.42	7.0	8.00[a]	9.0	0.529
VAS T1	3.0	2.07	2.0	3.00[b]	4.0	4.14	1.93	2.75	4.00[b]	5.25	**0.042**
VAS T2	3.43	2.58	1.5	4.00[b]	6.0	4.55	2.96	2.5	4.50[b]	8.0	0.182
P*	**<0.001**					<0.001					
NDI TO	17.48	7.61	11.5	15.00[a]	23.5	20.82	8,37	15	20,00[a]	26.25	0.189
NDI T1	9.43	5.24	5.0	9.00[b]	13.0	13.41	6.75	8.75	14.00[b]	18.25	**0.043**
NDI T2	8.29	5.66	3.0	9.00[b]	13.5	11.77	6.58	6.0	10.50[b]	18.0	0.082
P*	**0.001**					<0.001					

*: p<0.05, The Friedman test (comparison of periods). Periods that showed significant differences are symbolized with completely different letters (e.g., [a] and [b]). **: p<0.05 Mann–Whitney U test (difference between two groups). SD: standard deviation.

the posttreatment assessment (p-values of 0.042 and 0.043 respectively). However, no significant differences were observed between the groups before treatment or at the 3-month follow-up (Table 2).

The six sub-parameters of the NPH along with the total scores for parts 1 and 2 were evaluated. Comparisons were made between and within groups. Regarding the total scores for part 1, no significant differences were observed between the two groups at baseline, posttreatment, or at the three-month follow-up. However, it was noted that the total score significantly decreased post-treatment in both groups (p-values of 0.009 and 0.049, respectively), and this level was maintained at the 3-month follow-up (Table 3).

Within-group comparisons revealed a significant reduction in the pain subparameter for both groups in

Table 3. Nottingham Health Profile comparison in and between groups.

	Point by point (n=21)					Napa j (n=22)					
	Mean	SD	Percentiles			Mean	SD	Percentiles			
			25th	Median	75th			25th	Median	75th	P**
NHP T0 pain	54.19	33.39	22	52.00[a]	91.5	56.36	26.1	31	59.00[a]	80	0.874
NHP T1 pain	20.1	23.44	4.5	13.00[b]	20.5	35.95	27.08	14.5	30.50[b]	63.25	0.902
NHP T2 pain	26.1	27.44	0	13.00[b]	52	30.05	25.18	9	29.00[b]	50	0.990
P*	**0.001**					**0.003**					
NHP T0 emotional states	25.76	22.99	9.5	24.00[a]	34.5	27.36	26.43	0	22	48.25	0.524
NHP T1 emotional state	13.52	17.85	0	9.00[b]	21	25.91	26.73	0	22	36	0.275
NHP T2 emotional state	16.62	17.03	0	12.00[b]	23.5	21.36	20.57	0	17.5	35.25	0.785
P*	**0.013**					**0.528**					
NHP T0 sleep	30.62	28.15	0	27.00[a]	59	29.32	25.62	0	31.5	51.5	0.653
NPH T1 sleep	7.57	20.27	0	0.00[b]	0	29.27	27.74	0	21.5	56.5	0.496
NHP T2 sleep	22.71	33.86	0	0.00[b]	40	31.05	25.98	0	40	56	**0.036**
P*	**0.001**					**0.886**					
NHP T0 isolation	9.67	14.28	0	0	19.5	14.32	20,6	0	0	22.25	0.114
NHP T1 isolation	3.52	9.38	0	0	0	14.09	19.03	0	0	36.5	**0.002**
NHP T2 isolation	6.52	15.19	0	0	6.5	12.91	18.69	0	0	31.25	**0.024**
P*	**0.296**					**0,169**					
NHP T0 mobility	18.71	19.77	0	11	27	23.45	17.18	11	21.5	34.25	0.990
NHP T1 mobility	18.95	17.96	0	12	28.5	18.68	17.15	0	17.5	33	0.275
NHP T2 mobility	17.24	12.26	5	22	23	20.59	16.05	7.5	22	31.25	0.531
P*	**0.839**					**0.905**					
NHP T0 Energy	53.0	37.38	23	63	88	57.14	40.15	18	61.5	100	0.119
NHP T1 Energy	27.29	36.58	0	0	50	42.36	44.28	0	24	100	0.509
NHP T2 Energy	49.1	42.92	0	55	100	48.45	44.52	0	47	100	0.529
P*	**0.338**					**0,070**					
NHP T0= total 1	186.76	86.29	119.5	184.00[a]	260.5	206.82	112.99	131.5	219.50[a]	283.25	0.226
NHP T1 total1	90.9	93.17	33	70.00[b]	123	166.5	135.47	62.25	115.00[b]	310	0.199
NHP T2 total1	138.76	113.05	54.5	120.00[b]	213	160.09	113.17	51.75	139.00[b]	272.25	0.531
P*	**0.009**					**0.049**					
NHP T0 total2	1.95	1.6	1	2	3	2.32	1.89	0	2.5	4	0.496
NHP T1 total2	1.29	1.45	0	1	2	2.27	2.05	0	2	4	0.119
NHP T2 total2	1.14	1.15	0	1	2	1.77	1.45	0.75	1.5	3	0.146
P*	**0.140**					**0.345**					

*: p<0.05, The Friedman test (comparison of periods). Periods that showed significant differences are represented with completely different letters (e.g., [a] and [b]). **: p<0.05 ,Mann-Whitney U test (difference between two groups).

the post-treatment assessment compared with pre-treatment scores, and this improvement was maintained through the third month (point by point p=0.001, napaj p=0.003). Significant differences were noted in the emotional and sleep subparameters for the point-by-point technique, with p-values of 0.013 and 0.001, respectively, between the pre-treatment and post-treatment assessments. Comparisons of the treatments within themselves revealed no significant differences in other parameters (p>0.05).

When comparing the point-by-point technique to the rappage technique, the point-by-point technique demonstrated statistically significantly lower scores in the NPH sleep parameter at the 3- month assessment (p=0.036). Additionally, for the isolation parameter, the point-by-point technique showed statistically significantly lower scores than the nappage group both post-treatment and at the 3-month mark (p=0.002, p=0.024). No significant differences were found in the other sub-parameters between the groups (p>0.05). Furthermore, in the NPH total 2 scores, no significant differences were observed over time, either within or between the groups.

In our study, a total of 40 female and 3 male patients were included. For further evaluation, participants were divided into two groups based solely on their sex, independent of the treatments they received. The changes in the VAS scores over time were assessed. For female patients, the average VAS score before treatment was 7.80±1,539, after treatment it was 3.60±2,122, and at the 3-month follow-up, it was 4.13±2,848. For male patients, the average VAS score before treatment was 8.00±1,732, after treatment it was 3.33±1,155, and at the 3-month follow-up, it was 2.33±1,528. No significant differences were found between the two groups regarding VAS scores before treatment, after treatment, or at the 3-month follow-up (p>0.05).

When examining the correlation between patients' age and VAS scores, as well as between patients' BMI values and VAS scores in each period, no correlation was found at any assessment time (p>0.05).

Discussion

In this study, we compared the effects of monotherapy, which was applied using two different techniques, on pain, functional status, and quality of life in patients with chronic nonspecific neck pain. This study is the first to examine this specific topic. The current results showed that both techniques were effective in reducing pain and improving functional status. However, in the initial post-treatment evaluation, the point-by-point technique was found to be statistically more effective than the rappage technique in terms of pain reduction and functional improvement. This difference was not observed in the 3-month follow-up evaluations.

Mesotherapy has been suggested as an ideal treatment for all localized musculoskeletal pain[15]. The analgesic mechanism of this treatment includes pharmacological effects, micro-traumatic effects induced by the needle and the injected solution, and endocrine neuro-immune reactions, defined under the concept of mesodermal modulation. In this concept, the dermis is considered a new target organ for analgesic effects[16,17]. Recent studies have demonstrated the presence of dermis structures that can actively participate in pain modulation. The dermis, particularly glial cells, may be new potential targets for drugs administered through monotherapy[18]. These results suggest that the analgesic effect is not solely due to local pharmacological action but also involves complex interactions between the intradermal technique and dermal pain control systems. Therefore, dermal depth is crucial for the achievement of analgesic effect in monotherapy. The dermis thickness varies according to body location, sex, and age[19]. Based on these individual differences, standardizing intradermal injections may be difficult. In the early years of monotherapy, the depth of the injections was observationally defined based on the benefits obtained[8]. Mrejen D.[20] compared injections at depths of 4 and 10 mm and observed that substances injected at 10 mm diffused more quickly and entered the systemic circulation faster. Based on this study, injections should not exceed a depth of 4 mm. The optimal injection depth remains a research topic. The Italian Society of Mesotherapy recommends adjusting the needle angle to approximately 30°, depending on the dermis thickness[8,9]. There are no randomized studies comparing the effectiveness of superficial versus deep dermal injections[9]. In our study, we utilized two injection techniques: the point-by-point technique (deep intradermal injection, 4 mm depth) and the rappage technique (superficial intradermal injection, 1-2 mm depth)[7]. Since we could not measure dermal thickness in this study, we followed the recommended injection techniques in the literature for these depths[7,8,15]. Our study included 93% female and 7% male patients. The mean ages and BMIs were 47.14 and 26.83 for the point-by-point group and 41.05 and 26.02 for the rappage group, respectively. In the primary outcome measure, the VAS scores demonstrated pain reduction. There were no significant correlations between sex, age, BMI (factors that affect dermal thickness), and VAS scores (p>0.05). This result indicates that not only dermal depth but also several other factors, such as the needle and the administered drug, contribute to the analgesic effect.

Mesotherapy has been shown to result in prolonged drug diffusion into underlying tissues while maintaining tissue concentrations longer than intramuscular administration, with clinical outcomes comparable to other systemic routes (intravenous, intramuscular, oral)[6,9,15,21,22]. In a study comparing doses of the same drug, patients receiving lower concentrations of monotherapy exhibited similar results to those receiving higher doses[17]. Additionally, studies comparing the use of multiple drugs in one syringe with the use of a single analgesic drug in monotherapy found similar clinical outcomes in patients with acute, subacute, or chronic pain[16]. Mesotherapy, even at minimal doses, is an economical treatment option due to its drug-saving effect. In our treatment, we used a solution consisting of 1 mL of 2% lidocaine and 1 mL of 2.5 mg of tenoxicam, which is only 12.5% of the NSAID dose. Analgesic effects were achieved at a low dose and volume (2 mL).

Mesotherapy is a safe method[10]. Systemic analgesics and anti-inflammatory drugs, which are frequently used for pain management, can cause life-threatening side effects, especially in elderly patients and those requiring polypharmacy[23]. Mesotherapy is also an advantageous method for this purpose. The potential side effects of monotherapy include bleeding at the site of injection, pain, local reactions, nausea, vomiting, numbness, sweating, fatigue, and headache. These side effects are mild and transient and do not require additional treatment[10]. It is seen in the literature that different drug mixtures are used in monotherapy treatment[21,24-26]. With monotherapy using multiple drug mixtures, the risk of drug interactions and local side effect increases. Studies have shown that monotherapy with a single drug is as effective in reducing pain as monotherapy with multiple drug mixtures[27-30]. Therefore, the use of multiple mixtures in monotherapy is not recommended[16]. In our study, no side effects other than pain were observed during the procedure. Because fewer injections are required and cause less pain, the poınt by poınt technique can be considered a more comfortable method for patients than the nappage technique.

Neck pain significantly affects daily quality of life[31]. Studies on monotherapy have shown positive effects on functional status and quality of life in patients with neck, low back, and knee pain[24,29,32,33]. In this study, we observed improvements in NDI scores in both groups. However, the point-by-point group demonstrated statistically more significant improvements in the initial post-treatment assessment compared with the nappage group. In the Nottingham Health Profile sub-parameters assessing health status and quality of life, the point-by-point group showed statistically better improvements although both groups exhibited clinical improvements. We conclude that this difference may be related to the small sample size.

Study Limitations

Our study was a retrospective study. Despite the power analysis determining the sample size, the small number of patients and the inability to objectively measure dermal depth were limitations. However, this pilot study provides useful data for calculating the statistical sample size required for future research on the most effective injection technique in monotherapy.

CONCLUSION

In conclusion, our study shows that monotherapy using a local anesthetic-NSAID cocktail injected at different dermal depths using different techniques is an effective, safe, economical, and well-tolerated method for treating non-specific neck pain. This treatment approach may be an alternative or complementary option to other treatment approaches for localized musculoskeletal pain. Both techniques were effective, but the point-by-point technique was more effective in the short term and provided a more comfortable injection experience for patients.

Ethics

Ethics Committee Approval: This study was approved by the Clinical Research Ethics Committee of Istanbul Medeniyet University of Health Sciences Göztepe Training and Research Hospital (decision no: 2023/0813, date: 29.11.2023).

Informed Consent: Since this study was retrospective, patient consent was not required.

Footnote

Conflict of Interest: The authors have no conflict of interest to declare.

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REFERENCES

1. Bier JD, Scholten-Peeters WG, Staal JB, et al. Clinical practice guideline for physical therapy assessment and treatment in patients with nonspecific neck pain. Phys Ther. 2018;98:162-71.
2. Ranieri M, Marvulli R, D'Alesio E, et al. Effects of intradermal therapy (mesotherapy) on bilateral Cervicobrachial pain. J Pers Med. 2024;14:122.
3. Childress MA, Samantha SJ. "Neck pain: initial evaluation and management. Am Fam Physician. 2020;102:150-6.

4. Kazeminasab S, Nejadghaderi SA, Amiri P, et al. Neck pain: global epidemiology, trends and risk factors. BMC Musculoskelet Disord. 2022;23:26.
5. Wirth B, Humpreys BK, Peterson C. Importance of psychological factors for the recovery from a first episode of acute non-specific neck pain-a longitudinal observational study. Chiropr Man Therap. 2016;24:9.
6. Paolucci T, Bellomo RG, Centra MA, et al. Mesotherapy in the treatment of musculoskeletal pain in rehabilitation: the state of the art. J Pain Res. 2019;2391-401.
7. Sivagnanam G. Mesotherapy The french connection. J Pharmacol Pharmacother. 2010;1:4-8.
8. Mammucari M, Russo D, Maggiori E, et al. Evidence based recommendations on mesotherapy: An update from the Italian society of Mesotherapy. Clin Ter. 2021;171:37-45.
9. Mammucari M, Maggiori E, Russo D, et al. Mesotherapy: from historical notes to scientific evidence and future prospects. Scientific World Journal. 2020:3542848.
10. Faetani L, Ghizzoni, D., Ammendolia A, et al. Safety and efficacy of mesotherapy in musculoskeletal disorders: A systematic review of randomized controlled trials with meta-analysis. J Rehabil Med. 2021;53:jrm00182.
11. Karcioglu O, Topacoglu H, Dikme O, et al. A systematic review of the pain scales in adults: Which to use? Am J Emerg Med. 2018;36:707-14.
12. Young IA PT, DSc, Dunning J PT, et al. Reliability, construct validity, and responsiveness of the neck disability index and nric pain rating scale in patients with mechanical neck pain without upper extremity symptoms. Physiother Theory Pract. 2018;35:1328-35.
13. Busija L, Ackerman IN, Haas R, et al. Adult measures of general health and health-related quality of life. Arthritis Care Res. 2020;72(Suppl 10):522-64.
14. Farrar JT, Young JP Jr, LaMoreaux L, et al. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. Pain. 2001;94:149-58.
15. Mammucari M, Maggiori E, Lazzari M, et al. Should the general practitioner consider mesotherapy (intradermal therapy) to manage localized pain?. Pain Ther. 2016;5:123-6.
16. Mammucari M, Paolucci T, Russo D, et al. A call to action by the Italian Mesotherapy Society on scientific research. Drug Des Devel Ther. 2021;15:3041-7.
17. Bifarini B, Gori F, Russo D, et al. Intradermal therapy (mesotherapy): the lower the better. Clin Ter. 2022; 173:79-83.
18. Abdo H, Calvo-Enrique L, Lopez JM, et al. Specialized cutaneous Schwann cells initiate pain sensation. Science. 2019;365:695-9.
19. Van Mulder TJ, de Koeijer M, Theeten H, et al. High frequency ultrasound to assess skin thickness in healthy adults. Vaccine. 2017;35:1810-5.
20. Mrejen D. Semeiologie, Pharmacocinetique et profondeur des injections en mèsothérapie. In: Bulletin 5 Des Communications Du 6e Congrès International de Mesothérapie; 1992; Bruxelas, Bélgica. Paris: Société Française de Mésothérapie; 1992:13-14.
21. Akbas I, Kocak MB, Kocak AO, et al. Intradermal mesotherapy versus intravenous dexketoprofen for the treatment of migraine headache without aura: a randomized controlled trial. Ann Saudi Med. 2021;41:127-34.
22. Chen L, Li D, Zhong J, Qiu B, et al. Therapeutic effectiveness and safety of mesotherapy in patients with osteoarthritis of the knee. Evid Based Complement Altern Med. 2018:6513049.
23. Babatunde OO, Jordan JL, Van der Windt DA, et al. Effective treatment options for muscu loskeletal pain in primary care: a systematic overview of current evidence. PLoS One. 2017;12:0178621.
24. Tseveendorj N, Sindel D, Arman S, et al. Efficacy of Mesotherapy for Pain, Function and Quality of Life in Patients with Mild and Moderate Knee Osteoarthritis: A Randomized Controlled Trial. J Musculoskelet Neuronal Interact. 2023;23:52-60.
25. Conforti G, Capone L, Corra S. Intradermal therapy (mesotherapy) for the treatment of acute pain in carpal tunnel syndrome: a preliminary study. Korean J Pain. 2014;27:49-53.
26. Costantino C, Marangio E, Coruzzi G. Mesotherapy versus systemic therapy in the treatment of acute low back pain: a randomized trial. Evid Based Complement Alternat Med. 2011:317183.
27. Ferrara PE, Ronconi G, Viscito R, et al. Efficacy of mesotherapy using drugs versus normal saline solution in chronic spinal pain: a retrospective study. Int J Rehabil Res. 2017;40:171-4.
28-.Paolucci T, Piccinini G, Trifan PD, et al. Efficacy of trigger points mesotherapy for the treatment of chronic neck pain: a short term retrospective study. Int J Phys Ther Rehab. 2016;2:113.
29. Saggini R, Di Stefano A, Dodaj I, et al. Pes anserine bursitis in symptomatic osteoarthritis patients: a mesotherapy treatment study. J Altern Complement Med. 2015;21:480-4.
30. Di Cesare A, Giombini A, Di Cesare M, et al. Comparison between the effects of trigger point mesotherapy versus acupuncture points mesotherapy in the treatment of chronic low back pain: a short term randomized controlled trial. Complement Ther Med. 2011;19:19-26.
31. Scaturro D, Vitagliani F, Signa G, et al. Neck pain in fibromyalgia: treatment with exercise and mesotherapy. Biomedicines. 2023;11:892.
32. Senara S, Abdel WAY. THU0600 value of mesotherapy for treatment of chronic low back pain: a randomized trial. 2015;74(Suppl 2):418.
33. Yang XN, Geng ZS, Zhang XL, et al. Single intracutaneous injection of local anesthetics and steroids alleviates acute nonspecific neck pain: A CONSORT-perspective, randomized, controlled clinical trial. Medicine (Baltimore). 2018;97:11285.