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Patient and Physiotherapist Perspectives on Patient Positioning During Electrotherapy for Radiculopathy: A Qualitative Study

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ABSTRACT

Aim: Positioning of the patients with cervical (CR) and lumbosacral radiculopathy (LR) during the electrotherapy (ET) session may affect the clinical outcomes, comfort, and satisfaction. There have been no studies concerning the positioning of such patients during ET. This study aimed to investigate experiences of physiotherapists and patients- with CR and LR- regarding patient positioning during ET.

Methods: This is a qualitative study conducted in Egypt from August to September 2024 and included 10 patients with cervical or lumbosacral radiculopathy and 10 clinical and academic orthopaedic physiotherapists. Patients were interviewed face-to-face at the clinics and physiotherapists were interviewed via online using a pre-prepared semi-structured questionnaire including questions about demographic data, determinants of position, and ways of patient positioning and their impact. Data were analysed using thematic analysis and SPSS (v. 27).

Results: Regarding determinants of patient position during electrotherapy session; 3 determinants were reported including condition type (70%), patient comfort and availability of space in the clinic. Regarding proper position; 4 patient positions were reported including prone-lying (90% of physiotherapists and 40% of patients), supine-lying, sitting, and side-lying positions with/out some modifications. Electrotherapy session lasted 25-60 minutes. Symptoms reduced moderately (40-70%) in these positions.

Conclusion: Based on the findings of this study. Patient position during the electrotherapy session may be determined according to the patient condition with consideration to the experiences of physiotherapists. Clinical guidelines and training programs for physiotherapists should emphasize the importance of individualized patient positioning, taking into account the patient's specific condition and comfort.

Keywords: *Electrotherapy, cervical radiculopathy, lumbosacral radiculopathy, patient position.*

1. Introduction

Cervical radiculopathy (CR) is a prevalent type of neck disorders which leads to significant pain and disability due to nerve root (mainly C6,7) compression, inflammation, and dysfunction.[1,2] CR specifically refers to radiating arm pain accompanied by motor (e.g. muscle weakness), reflex, and sensory changes (e.g. paresthesia and numbness) according to the compressed nerve root. These symptoms are provoked by certain neck positions or motions.[2,3] Nerve root compression occurs from herniated discs or degenerative changes in the zygapophyseal joints.[4,5] The prevalence and annual incidence of CR are approximately 85 per 100,000. CR can be diagnosed using magnetic resonance imaging and nerve conduction study.[6] Physiotherapy interventions for CR include exercise, manual therapy, and biophysical modalities like transcutaneous electrical nerve stimulation (TENS), ultrasound (US), infrared radiation, and hot pack.[7]

Lumbosacral radiculopathy, where pain radiates down the legs, affects about 10% of patients with low back pain (LBP), which affects about 60-80% of the general population at least once during their life. Lumbar disc herniation (LDH) is a common cause of LR and LBP by compressing and irritating the nerve roots. LBP causes significant disability and activity limitations.[8] The pain is characterized by being burning, sharp, or electric.[9] LDH commonly occurs in young people at L4–L5 and L5–S1 and in old ones at L2–L3 and L3–L4 levels.[10] The condition diagnosed by MRI with history and physical examination.[11,12] The treatment includes medications, exercises, manual therapy, and modalities.[13]

Electrotherapy is the use of electrical modalities for therapeutic purposes such as analgesia or muscle stimulation.[14] It is frequently used in common physiotherapy practice.[15] There are many energy sources in electrical modalities such as: electrical as in transcutaneous electrical nerve stimulation (TENS) and iontophoresis, electromagnetic as in ultrasound (US) and shortwave, mechanical as in shock wave or light energy as infrared (IR) and LASER. This energy penetrates the skin causing analgesia (inhibiting nociceptors to transmit pain, stimulating A beta fibers, and releasing opioids as in TENS), stimulating blood cells migration and promoting the inflammation process, accelerating wound healing, and stimulating or relaxing the muscles.[16,17] IR relieves pain by increasing blood flow, decreasing muscle spasm, and increasing wound healing.[18] US sends an electrical signal through the crystals in the probe's head, causing them to vibrate and create mechanical waves at frequencies beyond human hearing (20 Hz to 20,000 Hz). The energy from these waves is either transferred to the surface of the body or focused on deeper tissues.[19] The session lasts between 10 and 60 minutes based on the modality.[20,21] Electrical modalities (e.g., interferential current, TENS, shock wave, LASER, and high voltage) help reduce neck and back pain.[20,22,23]

During the application of the electrical modalities, the patients assume a predetermined position directed by the physiotherapist. These positions include; supine (horizontal orientation in which the body lies with the face and upper torso facing upwards), prone (the opposite of supine), semi-prone (halfway between side lying and prone with the lower arm behind and the upper arm flexed at the shoulder and elbow. The upper leg is more acutely flexed at the hip and the knee than the lower leg), lateral recumbent (lying on the side, either right or left), which reduces lordosis and promotes good back alignment. Fowler's position (sitting upright or with a slight incline).[24]

During my clinical practice journey, for about 15 years, especially with patients experiencing radicular symptoms, I've noticed that the patient's position during physiotherapy (particularly during electrotherapy sessions, where they often remain in one position for a long time) affects their symptoms and comfort. Positioning the patient during the ET session may affect his/her comfort, pain (central or radicular) level, and improve patient satisfaction and treatment outcomes. For example, symptoms of CR are provoked by certain neck positions.[2,3] However, previous literature is inconsistent and unclear about positioning the patients with CR and LR during the ET session. Although previous studies have explored electrotherapy parameters (e.g., intensity and frequency), little attention has been given to optimal patient positioning, which is a critical factor that may influence treatment efficacy and patient comfort. This may be due to differences in clinical presentations of radiculopathy patients, therapeutic modalities applied, and perspectives of both patients and physiotherapists.

Martins-de-Sousa et al. (2020)[25] positioned the patients in an upright sitting position during a TENS session to relieve their neck pain. Ammendolia et al. (2019)[15], Seo et al. (2020)[21], SACHELARIE et al. (2021)[26], Jain et al. (2023)[27] and Bajaj et al. (2023)[28] did not describe the patient position during ET (e.g., TENS, microcurrent, LASER, interferential, heating, etc). Iakovidis et al. (2024)[23] placed the patients in a prone position with their neck in a neutral position during TENS to reduce neck pain. Abdelmageed et al. (2021)[22] placed the patients with LDP in the prone position during the shock wave and TENS without mentioning any adjustments based on the condition (e.g., pillow under lower abdomen to prevent hyperlordosis).

Furthermore, patient positioning (either supine or prone) affected diagnosis or imaging findings in patients with spinal pain with/out radiculopathy due to different loading.[29] In line with that, patient position may affect patient symptoms during ET session. Some research recommended further investigation about patient position but in other population[30]. Only one study was found in literature to address effect of patient position (prone) on radiculopathy-related pain and reported positive effect.[31]

This qualitative study provides a foundation for physiotherapists to individualize and optimize management approaches for patients with cervical and lumbosacral radiculopathy from disc prolapse by investigating proper patient position during ET based on patient and physiotherapist perspectives. This objective aligns with patient-centered and biopsychosocial approaches for care by focusing not only on illness, but also on experience, needs, and psychology of the patient.[32]

2. Material and methods:

2.1. Design:

A qualitative study design was applied.[33] Patients and physiotherapists were interviewed to explore their opinions and experiences of patient positioning during the electrotherapy session. The topic guide contained questions and prompts.

2.2. Participants:

Purposive sampling was used to recruit patients and physiotherapists from private clinics. Advertisements were put on social media (Facebook). Ten patients with cervical (N=5) or lumbosacral radiculopathy (N=5) (diagnosed by their orthopaedist based on imaging [disc protrusion compressing at least one nerve root] for more than 3 months) and on physiotherapy (more than 6 sessions) were included. CR patients had neck and arm pain below elbow and LR patients had LBP with leg pain. As well, 10 physiotherapists who were dealing with orthopaedic and spine cases for at least 2 years were included. Sample size was determined based on data saturation; participants' enrolment was stopped after no new information or codes were identified.[34] All participants gave their consent to participate and their right to withdraw at any step without any consequences. Participant data were confidential (was coded).

2.3. Ethical approval:

This study was approved by faculty of physical therapy of Alsalam University research ethical committee (SREC.PT.SUE/2/325). As well, the study complied with the ethical standards of the Helsinki Declaration.

2.4. Procedures:

The researchers interviewed each participant separately using a pre-prepared semi-structured questionnaire containing items relevant to the aim of the study (patient positioning during electrotherapy session; determinants, positions, impact, etc.) (Table 1). This guide was developed by some authors of this study based on some literatures and validated by the principle investigator and some external practitioners in the field. Patients were interviewed face to face, whereas physiotherapists were interviewed online. This was done based on their preference and suitability. The interviews were conducted in English with physiotherapists and in Arabic with patients. Each interview lasted between 15 and 25 minutes. The interviews were recorded and transcribed. No identifiable information was reported.

Table 1. Semi-structured questionnaire.

For patients:
1. What is your name, sex, diagnosis, radiated pain side, and duration of pain?
2. Do you have chronic diseases (e.g. diabetes), physiotherapy session before that time?
3. What is your intensity of your neck, arm, low back, and leg pain/numbness?
4. How you/your therapist determine your position during electrotherapy session?
5. Which position decrease or increase your symptoms of radiculopathy? To what extent (rate on numerical pain rating scale [NPRS])?
For physiotherapists:
1. What is your education level, speciality, subspecialty, number of treated spine cases weekly, years of experience?
2. How you determine the position of your patients with cervical or lumbosacral radiculopathy during electrotherapy session?
3. Which position decrease or increase symptoms of radiculopathy in your patients? To what extent (rate on numerical pain rating scale [NPRS])?

2.5. Analysis:

Thematic analysis was used for the analysis of transcribed data. A software program was used for coding and organizing data during the analysis. Saturation of themes had been reached, so recruitment ceased.

All transcribed data were read gain and again to familiarize with them. Next, codes were generated relevant to study objective. An iterative process of identifying subthemes through reflective discussions was conducted throughout the analysis. Labels were attached to each quote during the coding process to identify whether it came from a patient or physiotherapist. Clusters of related subthemes were converted to overarching themes.

For credibility, two researchers; one internal [included in this research] and one external [outside this research] reviewed the records/audits, transcripts, and generated themes/quotes for any errors or losses.

After finalizing the themes, quotes were extracted for the article for transparency and to illustrate the findings.

3.Results:

3.1. Participants:

Twenty participants (10 patients and 10 physiotherapists) were included in this study between August 2024 and September 2024. Characteristics of the participants were presented in table (2&3).

Table 2. The Characteristics of participants (patients)

		Patients (N=10)
Gender	**Male**	2 (20%)
	Female	8 (80%)
Age		37.7±14
Radiated side	**Right**	4 (40%)
	Left	4 (40%)
	Bilateral	2 (20%)
Occupation	**Housewife**	5 (50%)
	Others (student, officer, teacher, technician, and manual worker)	1 for each (10% for each)
Surgery	**Yes**	2 (20%)
	No	8 (80%)
Analgesic use	**Yes**	3 (30%)
	No	7 (70%)
Comorbidities (DM)	**Yes**	2 (20%)
	No	8 (80%)
Neck pain (NPRS)		7.43±3.16
Arm pain (NPRS)		7.7±1.5

Back pain (NPRS)		6.57±2.37
Leg pain (NPRS)		4±2.83
Pain change after electrotherapy session (decrease or improve)	**3/7**	6 (60%)
	5/7	4 (40%)
Pain during the session (NPRS)		2.2±2.7
Session duration (Minutes)		34±14.1
Physical activity change after session	**Increased**	3 (30%)
	Decreased	1 (10%)
	Unchanged	6 (60%)

Table 3. Characteristics of participants (physiotherapists)

		Physiotherapists (N=10)
Gender	**Male**	**5 (50%)**
	Female	**5 (50%)**
Age (Years)	**<28**	**7 (70%)**
	>37	**3 (30%)**
Years of experience in physiotherapy		**2.7±1.4**
Number of spine cases treated weekly		**3.2±1.8**
Sub-speciality	**Spine**	**7 (70%)**
	Others	**3 (30%)**
Education	**BSc**	**4 (40%)**
	MSc	**3 (30%)**
	PhD	**2 (20%)**

3.2. Thematic analysis:

The thematic analysis was shown in the figure (1) which contains a summary of the themes and subthemes.

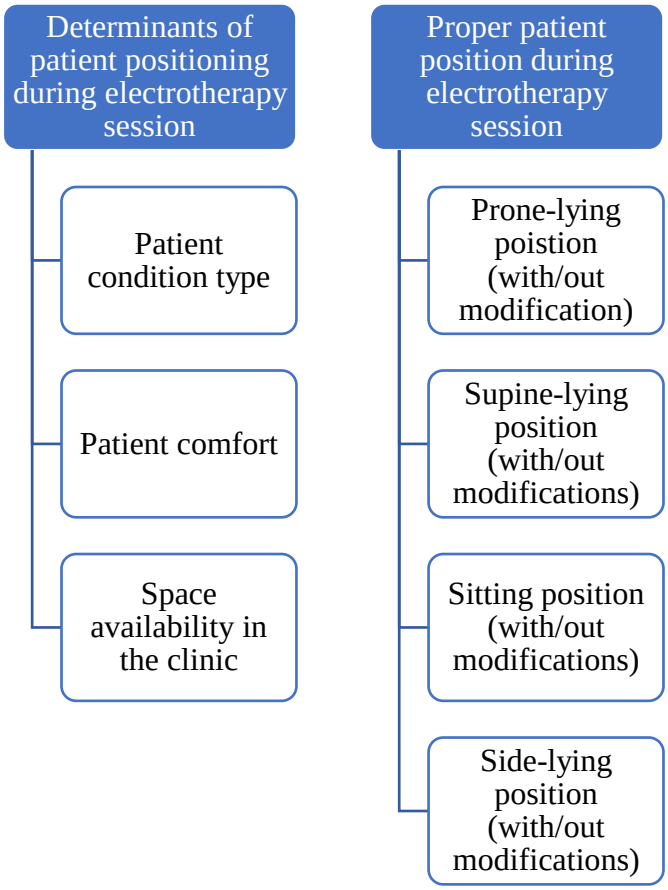

Figure 1. Themes and subthemes

3.3. Determinants of patient position during electrotherapy:

Three determinants were identified. The majority of physiotherapists placed their patients (who had cervical or lumbosacral radiculopathy due to disc prolapse) based on their condition (side of radiation, presence of surgery or not, associated illnesses, etc.), while only 1-3 physiotherapists chose the patient position based on patient comfort or availability of space in the clinic. Patients with cervical radiculopathy often took the position predetermined by their physiotherapist, which did not always align with their comfort, while patients with lumbosacral radiculopathy always chose their position based on their comfort.

'Yes, I always position my patients with radiculopathy during their electrotherapy session based on their condition; chronicity, direction of herniation or radiculopathy, if surgery was done, if there were comorbidities and so on.' (Physiotherapist 1)

'No, my physiotherapist did not choose my position, but I prefer to take the side-lying position on the right side as I have radicular pain to my left lower limb, in addition, I pull my flexed knees to my chest, this relieves my pains.' (Patient 10)

Patient condition or injury type:

The majority of physiotherapists (N=7) put their patients (who had cervical or lumbosacral radiculopathy due to disc prolapse) based on their condition/injury type (side of radiation, presence of surgery or not, associated illnesses, etc.). Half of the patients (4 with cervical radiculopathy and 1 with lumbosacral radiculopathy) often took the position predetermined by their physiotherapist, which was based on their condition (e.g., crock-lying with surgery).

'During my electrotherapy session, I always lie on my back with my knees flexed about 90 degrees because my physicians told me that this is safe and prevent or reduce my pains.' (Patient 4)

'There are many determinants for choice of the position for the patient during the electrotherapy session, for example in the acute phase or commonly first few (3-6) sessions, I prefer non-weight bearing position (e.g. lying down) then I progress with my patients to a more loaded position (e.g. sitting).' (Physiotherapist 7)

Patient comfort:

Few (N=2) physiotherapists chose the patient position based on patient comfort '*Really, I always ask my patients with cervical and lumbar radiculopathy to lie on their preferred and comfortable position during the electrotherapy session'* (Physiotherapists 1 and 2). Patients with lumbosacral radiculopathy always chose their position based on their comfort.

'I got my electrotherapy session on my neck as I had cervical disc prolapse which radiates pain to my left arm as directed by my physiotherapist, however I feels better regarding my pain in another position, lying on my back.' (Patient 2)

Availability of space in the clinic:

Only one physiotherapist sometimes put their patients (who had cervical or lumbosacral radiculopathy due to disc prolapse) based on the crowdedness of the clinic and availability of space in the clinic.

'Sometimes, I chose sitting position for my patients if there were large number of cases and no enough space in the clinic to position them lying on the bed.' (Physiotherapist 9)

3.4. Patient positions during the electrotherapy session:

Regarding the ways the physiotherapists position their patients or patients position themselves, there were 4 position types: (a) Prone lying position (with/out pillow under lower abdomen, with the head rested on the arms or position on the face opening on the bed); (b) Supine (flat or with knee flexed 90 degrees[Crock-lying], (c) Sitting (upright or with leaning forward and resting on arms /pillow on the bed), and d) Side-lying position (on either side). Physiotherapists reported that these positions reduced pain (by about 7.2 ±1.6 during the session) and after the session, the pain reduces to 2-3/10.

Prone-lying position:

Four patients (40%) (2 cervical and 2 lumbar cases) reported that the prone lying position (with pillow under lower abdomen [3 patients]) and the head on the opening of the face on the bed [one cervical case]. Nine (90%) physiotherapists recommended the prone position for all but one patient with lumbar radiculopathy during the electrotherapy session (5 of them recommended putting pillow under lower abdomen, one recommended hanging lower limb)

'Yeah, supine lying position and side-lying on my right side increase my pain greatly, but when I lie on my face with a pillow under my abdomen or when I lie on my left side my pain decreases by about 40% and my back and leg pain reach about 20% (2 points on NPRS). This is my comfortable position." (Patient 1)

'...prone-lying position is easy applicable, more stable for most patients with cervical and/or lumbar radiculopathy, so I recommend it often.' (Physiotherapist 3)

Supine-lying position:

Three patients (2 lumbar cases, 1 male) showed that their spinal and extremity pain improved with supine-lying (one patient added '*with knee flexed 90 degrees*' (Patient 4), and another added '*with high pillow under my head and upper trunk')* (Patient 5). None of the physiotherapists recommended the supine position for their patients as it is not easily applicable during application of all modalities *'No, I rarely use it'* (Physiotherapist 5).

'I used to lie on my back as I suffer from lumbosacral disc prolapse with pain on my right leg, this position alleviates my pains by about 40% initially, but later on in the session my pains reach about 90% [9 points on NPRS], this may be due to long session that reaches about 60 minutes.' (Patient 8, male)

Sitting position:

Two patients chose the sitting position (1 patient added '*with leaning forward on their arm on the bed*' (Patient 2)) as their comfortable position, which alleviated their symptoms. Three physiotherapists sometimes use this position (sitting while leaning forward and supported on the arms on the bed) with their patients, especially cervical cases or lumbar cases in case of limited space.

'*Although the supine-lying position relieves my pain moderately, the sitting position is my preferred and comfortable position that I always adopt during my electrotherapy session as I had a cervical problem with pain on my left arm. In contrast, side-lying, either on right or left sides increase my complaints.'* (Patient 10)

'*Sitting, I sometimes use it with my lumbar patients especially when there is no enough space or free bed.'* (Physiotherapist 10)

Side-lying position:

Only one patient was comfortable with the side-lying position which alleviated her symptoms. However, seven physiotherapists recommended doing the side-lying position (2 physiotherapists added '*with the radiated side uppermost and pillow under the side'*.

'*Fortunately, lying on my right side alleviated my left leg pain and my back pain greatly (about 70%) to an extent that I sometimes felt no pain in this position during the session. In contrast, sitting upright provokes my symptoms."* (Patient 9)

'*I always position my patients who have lumbosacral radiculopathy say to left side, I put them on their right side, flexion the uppermost leg toward the chest and a pillow under the side.'* (Physiotherapist 4)

4.Discussion

This study interviewed physiotherapists and patients with cervical and lumbar radiculopathy about their experiences regarding proper positioning and its determinants during electrotherapy sessions. Ten orthopaedic and spine physiotherapists mostly from female sex, of 25-45 years old, 50% got MSc/PhD, with about 3 years of experience on average, and treat about 3 spine cases weekly were participated in this qualitative study. In addition, ten patients with cervical or lumbosacral radiculopathy from disc prolapse were interviewed about the proper position during electrotherapy and its determinants and attributes. Three determinants were reported; patient condition, comfort, and space availability. Four positions were reported: prone, supine, sitting, and side-lying with/without some modifications. The majority of physiotherapists determine the patient position based on the patient condition and the majority of patients and physiotherapists prefer the prone-lying (with its derivatives) position. Patients reported moderate reduction of their symptoms during electrotherapy in these positions, and after the session, pain reach only about 2 /10 on average. This aligns with the study of Al Abdulwahab and Beatti (2006)[31] which, demonstrated that 20 minutes of prone positioning significantly improved both the intensity and distribution of pain in affected patients (A). This suggests that patient positioning should be considered as an essential factor when planning the electrotherapy sessions, as it can greatly enhance the therapeutic outcomes, particularly in radiculopathy cases. Determining the proper patient position during electrotherapy, especially in patient with radiculopathy is very important. Firstly, this session may last up to 60 minutes which, may bother the patients or provoke their symptoms if not chosen properly. Secondly, positions and postures were documented to provoke symptoms especially radicular pain in patients with radiculopathy.[2,3] Additionally, Chatterton et al. (2001)[30] conducted a survey to explore physiotherapists' practices and aims regarding patient positioning, particularly for stroke patients. The study found that positioning is crucial for optimizing treatment outcomes. This is the first study-up to knowledge of the researchers- which addressed this topic. Findings of this study greatly fill the gap of literature about proper patient position and its determinants and attributes during electrotherapy session. This study's findings provide practical guidance for electrotherapy administration in radiculopathy patients. Since both therapists and patients predominantly preferred the prone position (with abdominal pillow support), this should be considered the default position when clinically appropriate, while maintaining alternatives like side-lying or sitting for patients who cannot tolerate prone positioning. Clinicians should evaluate positional comfort before and during the session. During sessions lasting beyond 15 minutes, periodic position changes are recommended to prevent discomfort. However, this study has several limitations: the small sample size (10 physiotherapists and 10 patients) may limit the diversity of perspectives and reduce the generalizability of findings, a qualitative study, it lacks quantitative measurements which could have provided objective support for the reported symptom relief and predominance of female physiotherapists and their moderate experience level (average 3 years) could potentially influence their preferred treatment positions. Therefore, future studies should include larger, more diverse samples and combine both qualitative and quantitative research methods to confirm these results.

5.Conclusion

Patient position during electrotherapy session is chosen according to the condition to a large extent and patient comfort to a lesser extent. Pone-lying position alleviate the symptoms in majority of patients with radiculopathy followed by supine position. These findings fill the knowledge gap about proper patient position during electrotherapy which may improve clinical outcomes. Clinical guidelines and training programs for physiotherapists should emphasize the importance of individualized patient positioning, taking into account the patient's specific condition and comfort. Moreover, there should be standardized positioning checklist to ensure Pre-session evaluation of pain-provoking movements and Real-time comfort monitoring during sessions. Additionally, Structured Training Modules for physiotherapists covering: evidence-based positioning techniques for radiculopathy, patient communication strategies for comfort assessment and hands-on practice with position modifications.

Conflict of Interest:

The authors declare no conflict of interest.

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