IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 22, Issue 11 Ser.1 (November. 2023), PP 71-75
www.iosrjournals.org

Effect of IFT on Patient with Low Back Pain Due to Lumber Spondylosis

Dr. Md. Ahamedur Reza[1], Dr. Shohel Ahmed[2], Dr. Reehum Haque[3], Dr. Rajee Mahmud Talukder[4], Chiranjeeb Biswas[5]

1. Assistant Professor, Department of Physical Medicine, Medical College for Women and Hospital, Uttara, Dhaka, Bangladesh
2. Consultant (Physical Medicine & Rehabilitation), Brac Healthcare limited, Uttara Center, Dhaka, Bangladesh
3. Assistant Professor, Department of Internal Medicine Medical College for Women and Hospital, Uttara, Dhaka, Bangladesh
4. Associate Professor, Department of Medicine, Medical College for Women & Hospital, Dhaka, Bangladesh
5. Associate Professor and Head, Department of Psychiatry, Medical College for Women & Hospital, Dhaka, Bangladesh

Corresponding author: *Dr. Md. Ahamedur Reza, Assistant Professor, Physical Medicine department, Medical College for Women and Hospital, Uttara, Dhaka, Bangladesh*

ABSTRACT

Background: *Low back pain (LBP) due to lumbar spondylosis is a prevalent musculoskeletal condition causing significant pain, functional limitations, and reduced quality of life. Interferential Therapy (IFT), a non-invasive electrotherapy modality, has shown potential for symptom relief, yet high-quality evidence specific to lumbar spondylosis remains limited.*

Aim of the study: *The aim of this study was to evaluate the effectiveness of Interferential Therapy in reducing pain and improving functional outcomes in patients with low back pain due to lumbar spondylosis.*

Methods: *A prospective interventional study was conducted on 50 patients diagnosed with lumbar spondylosis-related LBP. Each patient received IFT for 20 minutes/day, five days a week for two weeks. Outcomes were measured using the Visual Analog Scale (VAS), Oswestry Disability Index (ODI), and Straight Leg Raise (SLR) test before and after treatment. Data analysis was performed using SPSS version 26. Paired t-tests were applied for continuous variables, and chi-square tests for categorical variables. A p-value ≤0.05 was considered statistically significant.*

Result: *Significant reductions were observed in mean VAS scores (7.6 ± 1.1 to 3.2 ± 1.0, $p<0.001$) and ODI scores (48.4 ± 6.5 to 22.9 ± 5.7, $p<0.001$), along with marked improvement in SLR angle ($43.5° \pm 7.0°$ to $65.3° \pm 6.2°$, $p<0.001$). Most patients transitioned from severe to mild/moderate pain and disability grades. Shorter symptom duration was significantly associated with better outcomes ($p=0.048$). Minor adverse effects were reported in only 6% of cases.*

Conclusion: *IFT is an effective and well-tolerated conservative treatment for LBP due to lumbar spondylosis, offering significant improvement in pain and function. Early intervention may enhance outcomes.*

Keywords: *Interferential Therapy, Low Back Pain, Lumbar Spondylosis, Electrotherapy, Oswestry Disability Index, Visual Analog Scale, Straight Leg Raise.*

I. INTRODUCTION

Low back pain (LBP) is one of the most prevalent and disabling musculoskeletal conditions globally, significantly impacting the physical, psychological, and socioeconomic well-being of individuals [1]. It is often ranked among the top causes of years lived with disability (YLDs) worldwide. In 2020, LBP affected an estimated 619 million people globally, and by 2050, this number is projected to rise to 843 million due to an aging population and increasing sedentary lifestyles [2]. In Bangladesh, musculoskeletal disorders continue to be a leading contributor to chronic illness, with national survey data indicating that approximately 18.6 % of adults suffer from LBP, making it the most frequently reported musculoskeletal (MSK) disorder in the country [3]. Lumbar spondylosis is a degenerative condition of the lumbar spine involving disc degeneration, osteophyte formation, and facet joint arthritis [4]. One of the most common underlying causes of chronic LBP is lumbar spondylosis, a degenerative condition of the spine characterized by disc desiccation, narrowing of intervertebral spaces, facet joint arthropathy, and formation of osteophytes [5]. Although often asymptomatic, lumbar spondylosis can result in significant clinical manifestations, including axial and radicular pain, muscle stiffness, neurogenic claudication, and functional impairment [6]. The global prevalence of lumbar spondylosis is estimated at 3–6 %, and the

condition becomes increasingly common with age. Its chronic nature can contribute to physical limitations, loss of productivity, frequent healthcare visits, and reduced quality of life [7]. The standard approach to managing lumbar spondylosis emphasizes conservative therapy, which includes physical therapy, exercise regimens, analgesic medications, manual therapy, and electrotherapy modalities [8]. Among these, Interferential Therapy (IFT) has emerged as a popular non-invasive electrotherapeutic technique in physiotherapy practice [9]. IFT utilizes two medium-frequency electrical currents that intersect at the treatment site to produce a low-frequency beat current that penetrates deeper into tissues with minimal discomfort [10]. It is believed to enhance pain modulation through stimulation of peripheral nerves and endogenous opioid systems, reduce muscle spasms, improve blood flow, and promote tissue healing [11]. Several randomized controlled trials have explored the clinical utility of IFT for chronic LBP, with some demonstrating notable reductions in pain levels (typically assessed by Visual Analog Scale), improvements in lumbar range of motion, and enhanced functional scores (such as Oswestry Disability Index or Roland-Morris Disability Questionnaire) [12]. However, findings across the literature remain mixed, with some studies reporting only marginal or temporary benefits [13]. Moreover, systematic reviews often rate the quality of evidence as low to moderate due to methodological limitations and heterogeneity in treatment parameters [14]. Despite these limitations, IFT continues to be widely implemented in clinical settings, especially in low- and middle-income countries, owing to its affordability, ease of administration, and favorable safety profile. However, high-quality, condition-specific studies focusing on lumbar spondylosis-related LBP are limited [15]. The aim of this study is to assess the therapeutic effectiveness of interferential therapy in reducing pain and improving function in patients with low back pain due to lumbar spondylosis.

II. METHODOLOGY & MATERIALS

This prospective interventional study was conducted in the Department of Physical Medicine, Medical College for Women and Hospital, Uttara, Dhaka, Bangladesh, over a period of 1 year from January 2022 to December 2022. The study aimed to evaluate the effectiveness of interferential therapy (IFT) in patients with low back pain (LBP) due to lumbar spondylosis. A total of 50 patients diagnosed with lumbar spondylosis-associated LBP were selected using a purposive sampling technique. The diagnosis was established based on clinical features and radiologic evidence (X-ray or MRI findings suggestive of lumbar spondylosis). All participants received a standardized course of IFT as part of their conservative management protocol.

Inclusion Criteria

- Patients aged between 30 and 60 years.
- Diagnosed cases of lumbar spondylosis with clinical symptoms of low back pain.
- Patients with pain duration of at least 4 weeks.
- Willingness to undergo interferential therapy sessions.

Exclusion Criteria

- Patients with disc prolapse or spinal stenosis requiring surgical intervention.
- History of spinal trauma, malignancy, or infections.
- Presence of pacemaker or metallic implants near the lumbar region.
- Pregnant or lactating women.
- Patients with neurologic deficits, systemic illness, or non-cooperative behavior.

Data Collection

Data were systematically gathered using a structured and validated questionnaire. The collected information included patient demographics (age, sex, occupation), duration of symptoms, and baseline clinical profiles. Each participant underwent interferential therapy (IFT) administered using a medium-frequency electrical stimulation device. The treatment was delivered five times per week for two consecutive weeks. The IFT parameters included a carrier frequency of 4000 Hz with a beat frequency of 80–100 Hz, applied for 20 minutes per session using a four-pole electrode placement over the lumbar region. All sessions were administered under the supervision of licensed physiotherapists.

Primary outcome variables were pain intensity, assessed by the Visual Analog Scale (VAS); functional disability, measured using the Oswestry Disability Index (ODI); and range of motion, evaluated through the Straight Leg Raise (SLR) angle. These assessments were recorded at two time points—before initiating IFT (pre-IFT) and after completing the two-week treatment course (post-IFT). In addition, pain severity grades, functional disability categories based on ODI scores, and any adverse effects or complications related to IFT were also documented. Data were collected using a structured, pre-tested data sheet following ethical approval from the Institutional Review Board, and informed written consent was obtained from all participants.

Statistical Analysis

Statistical analysis was performed using SPSS version 26. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. Pre- and post-treatment comparisons were analyzed using paired t-tests for continuous variables and chi-square tests for categorical data. A p-value ≤0.05 was considered statistically significant.

III. RESULT

A total of 50 patients were enrolled in the study. As shown in Table 1, the majority of participants (52.00%) were between 41–50 years of age, with a mean age of 45.2±9.4 years. Males constituted 56.00% of the sample, and 42.00% of participants were engaged in manual labor and 36.00% were in Sedentary. Symptom duration varied, with 42.00% experiencing low back pain for 3–6 months, and 30.00% reporting symptoms lasting over 6 months. The mean Visual Analog Scale (VAS) score decreased markedly from 7.6±1.1 to 3.2±1.0 ($p<0.001$), while the Oswestry Disability Index (ODI) improved from 48.4±6.5 to 22.9±5.7 ($p<0.001$). Similarly, the Straight Leg Raise (SLR) angle improved significantly from 43.5°±7.0° to 65.3°±6.2° ($p<0.001$) (Table 2). As detailed in Table 3, prior to IFT, 72.00% of patients had severe pain, which reduced to only 6.00% post-treatment. Conversely, the proportion of patients with mild pain increased from 6.00% to 54.00% ($p<0.001$). The patients with Moderate pain increased from 22.00% to 40.00% ($p<0.001$). Table 4 showed a substantial enhancement in functional status after therapy. Before treatment, 58.00% had severe disability and 22.00% were crippled. Following IFT, only 12.00% remained in the severe category, and crippled cases dropped to 2.00%. Meanwhile, 30.00% of patients reported minimal disability, and 56.00% showed moderate disability after treatment ($p<0.001$). Among patients with symptoms lasting less than 3 months, 26.00% showed clinical improvement, while only 2.00% did not. In the 3–6 months group, 36.00% improved and 6.00% did not. For those with symptoms persisting beyond 6 months, only 20.00% improved, whereas 10.00% did not. This trend demonstrates a statistically significant relationship ($p = 0.048$) (Table 5). Out of 50 patients, 4.00% experienced mild skin irritation, and 2.00% reported transient muscle twitching. The vast majority—94.00%, reported no complications at all (Table 6).

Table 1: Baseline Characteristics of Patients (N = 50)

Variables	Frequency (n)	Percentage (%)
Age (Years)		
31–40	4	8.00
41–50	26	52.00
51-60	20	40.00
Mean ± SD	45.2 ± 9.4	
Sex		
Male	28	56.00
Female	22	44.00
Occupation		
Sedentary	18	36.00
Manual laborer	21	42.00
Other	11	22.00
Duration of symptoms		
<3 months	14	28.00
3–6 months	21	42.00
>6 months	15	30.00

Table 2: Clinical Profile Before and After IFT (N = 50)

Variables	Pre-IFT (Mean ± SD)	Post-IFT (Mean ± SD)	p-value
Visual Analog Scale (VAS)	7.6 ± 1.1	3.2 ± 1.0	<0.001
Oswestry Disability Index (ODI)	48.4 ± 6.5	22.9 ± 5.7	<0.001
Straight Leg Raise (SLR)	43.5° ± 7.0°	65.3° ± 6.2°	<0.001

Table 3: Pain Severity Distribution Before and After IFT (N = 50)

Pain Severity	Pre-IFT		Post-IFT		p-value
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
Mild (VAS 1–3)	3	6.00	27	54.00	<0.001
Moderate (VAS 4–6)	11	22.00	20	40.00	
Severe (VAS 7–10)	36	72.00	3	6.00	

Table 4: Functional Status Based on ODI Grades (N = 50)

ODI Category	Pre-IFT		Post-IFT		p-value
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
Minimal Disability	1	2.00	15	30.00	<0.001
Moderate Disability	9	18.00	28	56.00	
Severe Disability	29	58.00	6	12.00	

Crippled	11	22.00	1	2.00	

Table 5: Association Between Duration of Symptoms and Improvement (N =50)

Duration of Symptoms	Improved		Not Improved		p-value
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
<3 months	13	26.00	1	2.00	0.048
3–6 months	18	36.00	3	6.00	
>6 months	10	20.00	5	10.00	

Table 6: Adverse Effects or Complications Related to IFT (N = 50)

Adverse Effect	Frequency (n)	Percentage (%)
Skin irritation	2	4.00
Muscle twitching	1	2.00
No complications	47	94.00

IV. DISCUSSION

Interferential Therapy (IFT), a form of medium-frequency electrical stimulation, is widely categorized as a non-invasive electrotherapeutic modality used in managing musculoskeletal pain, including low back pain due to lumbar spondylosis [16]. This study evaluated the clinical effectiveness of Interferential Therapy (IFT) in patients suffering from low back pain (LBP) due to lumbar spondylosis and revealed significant improvements across multiple domains, including pain intensity, functional disability, and straight leg raise (SLR) capacity. The therapy was also found to be well-tolerated, with minimal adverse effects. Our results closely align with previously published studies, reinforcing the role of IFT as a valuable conservative modality in managing chronic LBP associated with degenerative spinal changes. The demographic pattern of our cohort—mean age 45.2± 9.4 years with a male predominance (56%)—is comparable to that reported by Theologou et al., who found the majority of LBP patients receiving IFT to be in the 40–60 age group, with a slightly higher prevalence in males [17]. Occupational strain, especially among manual laborers (42% in our study), continues to be a recognized contributor to lumbar spine degeneration, as supported by Seidler et al., who found a significant relationship between occupational mechanical load and the incidence of lumbar spondylosis [18]. IFT demonstrated substantial efficacy in pain reduction in our population. The Visual Analog Scale (VAS) scores dropped significantly from 7.6 ± 1.1 to 3.2 ± 1.0 ($p<0.001$), indicating strong analgesic benefit. Similar outcomes were reported by Zambito et al., where IFT was associated with a statistically significant reduction in VAS scores over a two-week intervention period [19]. Moreover, the marked shift in pain severity distribution—from 72% of patients having severe pain pre-treatment to only 6% post-treatment—further supports the analgesic potency of IFT. Functional disability, assessed via the Oswestry Disability Index (ODI), also showed notable improvement, decreasing from 48.4 ± 6.5 to 22.9 ± 5.7 ($p<0.001$). This aligns with the findings of Albornoz-Cabello et al., who reported a mean ODI reduction of about 20 points following IFT sessions, suggesting that electrical stimulation not only reduces pain but also improves functional independence [20]. Our ODI grade shifts—from 58% with severe disability pre-treatment to only 12% post-treatment, and from 2% to 30% in the minimal disability category—underscore the clinical significance of this improvement. The increase in SLR from 43.5° ± 7.0° to 65.3° ± 6.2° ($p<0.001$) indicates reduced nerve root irritation or mechanical strain post-intervention. These findings mirror those of a randomized controlled trial by Ozturk et al., which demonstrated improved SLR and range of motion following IFT regimen in patients with radiculopathy [21]. The association between symptom duration and treatment response is particularly notable. Patients with a shorter duration of symptoms (<3 months) showed the highest improvement rate (93%), with decreasing improvement as symptom duration increased ($p=0.048$). This echoes the conclusion by Walston et al., who emphasized that early initiation of electrotherapy leads to better outcomes in degenerative spinal conditions [22]. In terms of safety, IFT was generally well-tolerated; only 6% of patients reported minor adverse effects (skin irritation and muscle twitching), with no serious complications. These findings are consistent with previous studies, where it is showed that IFT is a safe modality with minimal risk when applied correctly [23,24].

Limitations of the study: This study was limited by its short follow-up duration, which did not allow for evaluation of long-term effects or symptom recurrence after treatment. The lack of a control or placebo group makes it difficult to isolate the specific therapeutic impact of Interferential Therapy (IFT) from potential placebo or natural recovery effects. Additionally, the use of self-reported measures such as the Visual Analog Scale (VAS) and Oswestry Disability Index (ODI) may introduce subjective bias into the outcome assessment.

V. CONCLUSION

This study demonstrates that Interferential Therapy (IFT) is an effective and safe modality for managing low back pain associated with lumbar spondylosis. Significant improvements were observed in pain intensity, functional disability, and straight leg raise (SLR) angle following a two-week course of IFT. The majority of

patients transitioned from severe to mild or moderate pain and reported better functional outcomes, particularly those with a shorter duration of symptoms. Moreover, the therapy was well-tolerated, with minimal adverse effects. These findings reinforce the clinical utility of IFT as a non-invasive, affordable, and accessible treatment option, especially in low-resource settings. Further large-scale randomized trials are recommended to validate these results and optimize treatment protocols.

Funding: *No funding sources*
Conflict of interest: *None declared*
Ethical approval: *The study was approved by the Institutional Ethics Committee.*

REFERENCES

[1]. Stewart Williams J, Ng N, Peltzer K, Yawson A, Biritwum R, Maximova T, Wu F, Arokiasamy P, Kowal P, Chatterji S. Risk factors and disability associated with low back pain in older adults in low-and middle-income countries. Results from the WHO Study on Global AGEing and Adult Health (SAGE). PloS one. 2015 Jun 4;10(6):e0127880.
[2]. March L. THEBACKLETTER®.
[3]. Zahid-Al-Quadir A, Zaman MM, Ahmed S, Bhuiyan MR, Rahman MM, Patwary I, Das BB, Hossain SA, Paul S, Shahin A, Rahman M. Prevalence of musculoskeletal conditions and related disabilities in Bangladeshi adults: a cross-sectional national survey. BMC rheumatology. 2020 Dec 16;4(1):69.
[4]. Clarençon F, Law-Ye B, Bienvenot P, Cormier É, Chiras J. The degenerative spine. Magnetic Resonance Imaging Clinics. 2016 Aug 1;24(3):495-513.
[5]. Murena L, Canton G, Giraldi G, Bassini S. Spine pain: clinical features. InPain Imaging: A Clinical-Radiological Approach to Pain Diagnosis 2019 Mar 2 (pp. 119-133). Cham: Springer International Publishing.
[6]. Middleton K, Fish DE. Lumbar spondylosis: clinical presentation and treatment approaches. Current reviews in musculoskeletal medicine. 2009 Jun;2(2):94-104.
[7]. Aoki Y, Takahashi H, Nakajima A, Kubota G, Watanabe A, Nakajima T, Eguchi Y, Orita S, Fukuchi H, Yanagawa N, Nakagawa K. Prevalence of lumbar spondylolysis and spondylolisthesis in patients with degenerative spinal disease. Scientific Reports. 2020 Apr 21;10(1):6739.
[8]. Chen Q, Wang Z, Zhang S. Exploring the latest advancements in physical therapy techniques for treating cervical spondylosis patients: A narrative review. Biomolecules and Biomedicine. 2023 Oct 1;23(5):752.
[9]. Fuentes J. Alternating currents: Interferential therapy, Russian stimulation and burst-modulated low-frequency stimulation. Electro Physical Agents E-Book: Evidence-Based Practice. 2020 Mar 17;85(3):340.
[10]. KHIYAMI A, ALMALKI RS, KHAYAME N. A review of interferential therapy application in sport physical therapy. Saudi Journal of Sports Medicine. 2023 Jan 1;23(1):10-6.
[11]. Lee GI, Neumeister MW. Pain: pathways and physiology. Clinics in plastic surgery. 2020 Apr 1;47(2):173-80.
[12]. Hurley DA, McDonough SM, Dempster M, Moore AP, Baxter GD. A randomized clinical trial of manipulative therapy and interferential therapy for acute low back pain.
[13]. Bush PL, Pluye P, Loignon C, Granikov V, Wright MT, Pelletier JF, Bartlett-Esquilant G, Macaulay AC, Haggerty J, Parry S, Repchinsky C. Organizational participatory research: a systematic mixed studies review exposing its extra benefits and the key factors associated with them. Implementation Science. 2017 Oct 10;12(1):119.
[14]. Gagnier JJ, Moher D, Boon H, Beyene J, Bombardier C. Investigating clinical heterogeneity in systematic reviews: a methodologic review of guidance in the literature. BMC medical research methodology. 2012 Jul 30;12(1):111.
[15]. Swanson W. Hypofractionated Radiotherapy and Developing Cost-Effective Modalities for Low-and Middle-Income Countries (Doctoral dissertation, University of Massachusetts Lowell).
[16]. Rampazo EP, Júnior MA, Correa JB, de Oliveira NT, Dos Santos I, Liebano RE, Costa LO. Effectiveness of interferential current in patients with chronic non-specific low back pain: a systematic review with meta-analysis. Brazilian Journal of Physical Therapy. 2023 Sep 1;27(5):100549.
[17]. Theologou S, Trevlaki E, Trevlakis E. Effectiveness of Interferential Current for the treatment of chronic low back pain. European Journal of Medical and Health Sciences. 2022 Dec 25;4(6):113-8.
[18]. Seidler A, Bergmann A, Jäger M, Ellegast R, Ditchen D, Elsner G, Grifka J, Haerting J, Hofmann F, Linhardt O, Luttmann A. Cumulative occupational lumbar load and lumbar disc disease–results of a German multi-center case-control study (EPILIFT). BMC musculoskeletal disorders. 2009 May 7;10(1):48.
[19]. Zambito A, Bianchini D, Gatti D, Viapiana O, Rossini M, Adami S. Interferential and horizontal therapies in chronic low back pain: a randomized, double blind, clinical study. Clin Exp Rheumatol. 2006 Sep 1;24(5):534-9.
[20]. Albornoz-Cabello M, Maya-Martín J, Domínguez-Maldonado G, Espejo-Antúnez L, Heredia-Rizo AM. Effect of interferential current therapy on pain perception and disability level in subjects with chronic low back pain: a randomized controlled trial. Clinical rehabilitation. 2017 Feb;31(2):242-9.
[21]. Ozturk B, Gunduz OH, Ozoran K, Bostanoglu S. Effect of continuous lumbar traction on the size of herniated disc material in lumbar disc herniation. Rheumatology international. 2006 May;26(7):622-6.
[22]. Walston Z, McLester C. Importance of early improvement in the treatment of low back pain with physical therapy. Spine. 2020 Apr 15;45(8):534-40.
[23]. Maruf FA, Umunnah JO, Akosile CO. Potential hazards and possible safety precautions in electrotherapy. African Journal of Physiotherapy and Rehabilitation Sciences. 2013;5(1-2):8-15.
[24]. Tabasam G, Johnson MI. The use of interferential therapy for pain management by physiotherapists. International journal of therapy and rehabilitation. 2006 Aug 2;13(8):357-64.