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Original Article

Effects of myofascial release technique versus posterior-anterior glide on pain, disability, and quality of life in non-specific low back pain: A randomized controlled trial

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Abstract

Objective of this study is to evaluate effects of Myofascial release (MFR) versus posterior-anterior (PA) glide on pain, disability, and quality of life (QOL) in patients with nonspecific lower back pain (NSLBP). Eighty-six patients having LBP were recruited from 3 hospitals of Karachi, Pakistan. After randomization, group A received MFR and group B received PA glide with thermotherapy and stretching exercises. Outcome measures assessed were Short-Form McGill Pain Questionnaire-2(SF- MPQ-2), Ronald Morris Disability Questionnaire (RMDQ), and World Health Organization Quality of Life (WHOQOL-BREF) for pain, disability, and QOL, respectively at baseline, post-treatment (at 6 weeks), and follow-up (at 12 weeks). For mean comparisons repeated measures two-way ANOVA was applied. Statistical significance required a p-value less than 0.05. All outcome measures showed within-group significant improvement ($p<0.05$). However, between-Group differences were non-significant for all domains. Both interventions are found similarly effective in improving pain, disability, and QOL in NSLBP.

Keywords: chronic pain, disabled persons, exercise therapy, quality of life, low back pain

1. Introduction

Lower back pain (LBP) is a major reason of disability around the world that has a major impact on several other aspects of the health and wellbeing (Baig & Ansari, 2022). This involves 60% to 80% of persons at some period in their lives. Just a limited fraction of patients with back pain have a specific diagnosis, the rest fall into a nonspecific category (Colledge *et al*., 2014).

Nonspecific lower back pain (NSLBP) is a clinical condition not attributed to a particular pattern of pathology or symptom, usually accounting for about 80% of cases (Baig & Ansari, 2021). The global prevalence of LBP was found to be 7.5% or around 577 million people in 2017, which had increased to 619 (8.045) million cases globally in 2020, and this is further estimated to reach 843 (10.95) million people by the year 2050 globally, of which 90% of the cases are of nonspecific type. while projecting to be 6.82 % in south Asia by the year 2030 (Ferreira *et al*., 2023; Ibrahim, Sabari, Isa, & Gartika, 2022). Studies have reported that the prevalences of NSLBP in different countries such as Bangldesh, Nepal, India and Pakistan were 36.6%, 91%, 70% and 69.9% respectively (Ali, Ahsan, & Hossain, 2020 ; Javed *et al*., 2023; Sharma *et al*., 2019; Shetty *et al*., 2022).

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MFR is a technique that aims to restore the length of fascia, relieve pain, restore impaired functions of soft tissue, and increase functionality. MFR technique stretches the restricted fascia lengthening myofascial tissues. In this way, MFR unburdens the pain-sensitive structures and restores the motion of joints (Laimi *et al*., 2018).

On the other hand, the joint mobilization technique PA glides are graded passive oscillatory movements which are widely used for assessment and management of spinal segments and add-on stiffness to improve function (Park *et al*., 2017). These mobilization techniques have been found to be beneficial in lumbar mechanical pain, as they stimulate the joint mechanoreceptors which modify pain - spasm cycle (Khan, Al Torairi, & Shamsi, 2018; Samir, ZakY, & Soliman, 2016).

PA glides can be unilateral or central depending on the condition. PA glides (central) is used to treat lower back pain when symptoms of lumbar spine are due to faulty posture or when pain or muscle spasm is felt with movement; while PA glides (unilateral) is indicated when the symptoms are unilateral. As far as the authors know, there is a scarcity of information regarding the effects of both above interventions on the quality of life among patients with back pain. So, the objective of this study is to evaluate the effects of MFR versus PA glide on pain, disability, and quality of life in patients with NSLBP.

2. Materials and Methods

2.1 Study design and participants

This study is a Single Blinded, two-arm, Parallel design, RCT, with a group allocation ratio of 1:1. This study was conducted at the Physiotherapy Department of Sindh Institute of Physical Medicine & Rehabilitation, Civil hospital, and Rabia Moon Hospital from September 2021 to December 2021. The study population included patients with NSLBP for more than 3 months with an age range of 18 to 45 years and without referred leg pain (Amundsen *et al*., 2018). Patients suffering from any trauma, spinal infection or tumor, spinal fracture, previous spinal surgery, systemic disease, fibromyalgia, or cauda equine syndrome that might interfere with outcomes, specific neurological disease (like stroke), uncontrolled diabetes or hypertension, pregnant females, diagnosed cases of spondylolisthesis, spinal stenosis, spondylolysis, ankylosing spondylitis, structural deformity, congenital deformation, disc disease, scoliosis, and active structural deficit were excluded. One of authors of this study screened patients on the basis of diagnostic triage and red flags for nonspecific LBP; of all the candidate patients only those who fell in NSLBP category were included.

2.2 Sample size estimation

A sample size of 86 (43 in each group) was considered after adding a 20% drop-out ratio to a calculated sample size of 72. PASS version 15 (NCSS, Kaysville, Utah, USA), based on two independent sample t-test, allowing unequal variance, was used to calculate the sample size with the SF-MPQ section at 12 weeks, 15.28+ 12.59 (mean + S.D) of the MFR group and 23.7 + 12.59 (mean + S.D) of the control group (Arguisuelas *et al*., 2017). The ratio of sample sizes (Group 2/Group1) was 1 with 80% power of the test, 95% confidence interval.

2.3 Randomization and envelope concealment

Randomization was done using a computer-generated randomization method and the patients were distributed into two groups at the ratio 1:1. The evaluator and the therapist who administered the therapy did not read the allocation sequence along with group allocation. An independent person was made available for randomization and allocation, which was concealed using sequentially numbered sealed envelopes.

2.4 Blinding

The outcome assessor was blinded to the intervention type provided to the patient. He was not in know of the allocated treatment. However, the therapist and the patient were not blinded due to the nature of intervention.

2.5 Outcome measures

A physiatrist with fifteen years of experience screened all the patients for criteria and was unaware of the treatment allocation. At baseline and post-treatment, SF-MPQ-2, RMDQ, and WHOQOL- BREF were used as outcome measures for the assessment of pain, disability, and quality of life, respectively. SF-MPQ-2 and RMDQ were primary outcome tools and WHOQOL- BREF was a secondary outcome tool.

2.5.1 Short form McGill Pain questionnaire – 2 (SF-MPQ-2)

Participants completed the SF-MPQ-2 by rating the extent to which they experience each of 22 pain descriptors using an 11-point numeric rating scale (0 = **"**none**"** to 10 = **"**worst possible**"**). The SF-MPQ-2 comprised four summary scales. A total pain score is computed by adding participant ratings across all questions (Adelmanesh *et al*., 2012).

2.5.2 Roland Morris disability questionnaire (RMDQ)

It is a 24-point scale used to measure disability level. All the patients were asked whether the statements on RMDQ, related to their perceived limitations in daily activities, apply to them in the last 24 hours. The score was calculated by adding up the number of ‘‘yes**"** items. A higher number of the score reflects a higher level of disability, ranging from 0 (no disability) to 24 (maximal disability) (Roland & Morris, 1983).

2.5.3 World Health Organization quality of life: Brief version (WHOQOL- BREF)

All the patients were also asked to fill the WHOQOL-BREF before and after the treatment and at follow-up. It is used to assess the quality of life of an individual and includes 26 questions that represent an individual's perception of health and well-being. The

responses to questions are marked on a Likert scale of 1 to 5. A higher score indicates a better QOL. (Wong *et al*., 2018).

2.6 Intervention

All the intervention providers were trained and post graduated within the field of objective. The Group 'A' received a therapeutic approach of MFR. However, group 'B' received the therapeutic approach of PA glides. General stretching and thermotherapy were provided to both groups as the standard treatment. Each session of treatment lasted for about 45 minutes. Treatment duration was 6 weeks with 3 sessions per week (Baig *et al*., 2018; Duncan, 2021; Shariat, Anastasio, Soheili, & Rostad, 2020). No harm or adverse events were reported during or after the application of treatments.

2.6.1 Myofascial release

The cross-hand release technique of MFR was provided for the thoracolumbar fascia, Lumbosacral Junction, and Lateral lower back area. The therapist provided the hand pressure with the patient's tolerance level for 2 minutes. Prior evidence has suggested that pressure should be applied for a minimum of 90 seconds (Duncan, 2021; Shariat *et al*., 2020). The therapist bent towards the patient with hands to the tissue depth barrier then waited and followed with each subtle release in three areas.

1) Cross - hand release of the thoracolumbar fascia

The patient was prone lying with legs straight. The therapist was standing on the ipsilateral side of the back of the patient to be treated. One hand was placed on the T12 - L1 and the Second hand was placed on sacrum (Duncan, 2021).

2) Cross-hand release of the lumbosacral junction (L5 - S1 decompression)

The patient was prone lying with legs straight. The therapist was standing at the side of the management table. One hand was placed so that the palm of the therapist's hand was on patient's sacrum with the fingers of the hand across the sacrum and clearing the buttock cleft. The second hand was placed on the lower lumbar spine with fingers pointing toward the patient's head (Duncan, 2021).

3) Cross - hand release of lateral low back area

The patient was in the position side-lying with a pillow placed beneath the patient's waist. The therapist was standing behind the patient. One hand was placed at the iliac crest so that therapist's fingers pointed towards the patient's feet. The second hand was placed crossing above the first-hand casing the lower ribs and soft tissue between the ribs and hips so that fingers point to the patient's head (Duncan, 2021).

2.6.2 Posterior anterior glides

Patients assigned to group B received the therapeutic approach of PA glides. Patients were asked to lie in a prone position with arms by their sides. The therapist was at the side of the bed, fronting the patient's lumbar spine. The thumb tips were utilized as the contact points in the spinous process; elbows relaxed but steady. The therapist's sternum was above the hands. The therapist provided anterior force at the lumbar spinous process to glide the lumbar vertebra. The grade of PA glide was from 1 to 4, according to the tolerance level of the patient. Three sets of 120 oscillations/ minute were given with 30 seconds of rest between each set (Baig *et al*., 2018; Hengeveld, Banks, & Maitland, 2005).

2.6.3 General stretching exercises (GSEs)

GSEs for the lower back were applied to both groups as a gold standard. During the stretching session, rest was given for thirty seconds after five minutes (Hodges & Danneels, 2019). Each stretch exercise was applied with ten seconds hold in two sets of ten repetition each (Raza *et al*., 2020).

1) Stretching of latissimus dorsi

The patient was in a standing position and instructed to raise both hands above their head with fingers interlaced and palms facing upward. Stretching in this position as if reaching for the ceiling (Esquerdo, 2016).

2) Quadratus lumborum stretching

The patient was standing with feet slightly apart with one hand on the waist, while the other hand was raised of the side being stretched with performing lateral flexion of that side (Esquerdo, 2016).

3) Lower back extensor stretching

The patient was lying on the back; the flexed knee was moved passively to the chest one by one, while the patient was asked to breathe deeply and the position was held (Ohtsuki & Suzuki, 2012).

4) Hamstring stretching

In the same position, one hip joint was passively bent to 90 degrees then the knee joint was extended slowly and the position was sustained at maximum extension for ten seconds (Ohtsuki & Suzuki, 2012).

5) Tensor fasciae latae stretching

Tensor Fasciae Latae was stretched passively in the lateral recumbent position by doing extension and lateral rotation on the hip joint on the stretched side for approximately ten seconds (Ohtsuki & Suzuki, 2012).

2.6.4 Thermotherapy

Thermotherapy through a hot pack was also provided to both groups. Continuous thermotherapy (hot pack) for 20 minutes was given. A medium towel was used (Baig *et al*., 2018).

2.7 Data analysis procedure

Data were collected and analyzed using IBM SPSS Statistics version 23.0. Counts with percentages were reported for qualitative data sets. Mean with standard deviation were reported for quantitative variables. For baseline quantitative data sets the means were compared by using an independent samples t-test, and associations were reported by using the Pearson chi-square test for qualitative variables like gender and marital status with interventions. Between and within-group comparisons were done using two-way repeated measures ANOVA at baseline, 6th, and 12th weeks of study. A p-value less than .05 was considered statistically significant.

3. Results

The minimum number of visits for a meaningful intervention was 18 visits. Only those patients that completed the visits were included in the final results evaluation. A total of 86 patients were recruited in the study and division was made into two equal groups through randomization, out of which 3 patients from both groups dropped out (Figure 1) so 80 patients completed the 18 visits.

The demographic characteristics and outcome measures did not much differ between the two interventions at baseline. (Table 1). The within-group analysis of the MFR group for pain and disability using total SF-MPQ-2 and RMDQ scores showed significant ($p<.01$) improvement from baseline to post-treatment. The PA glide group also showed a significant ($p<.01$) improvement in mean total SF-MPQ-2 and RMDQ scores from baseline to post-treatment.

However, both groups also remained with significantly ($p<.01$) improved mean total SF-MPQ-2 and RMDQ scores after follow-up at the 12th week from baseline but only RMDQ showed significant improvement ($p<.05$) at follow-up on the 12th week from post treatment (Table 2).

The WHOQOL-BREF Physical Health, Social Relationship, and Environmental domain scores were also significantly ($p<.01$) improved after a 6-week treatment and at 12-week follow-up from baseline within both groups (Table 3). However, the between-group analysis showed a non-significant difference ($p>.05$) for mean pain and disability using SF-MPQ-2 and RMDQ scores between the MFR and PA glide groups at baseline, at post-treatment after 6 weeks, and at follow-up after 12 weeks (Table 4). The QOL using WHOQOL-BREF Physical Health, Social Relationship, and Environmental domain scores had also a non-significant ($p>.05$) difference at baselines, after treatment at 6 weeks, and at follow up after 12 weeks, between the groups (Table 5).

Table 1. Baseline characteristics of studied sample (n=80)

Characteristic	Study groups	
	MFR group (n=40)	PA glide group (n=40)
Age (years)[a]	35.2 ± 8.5	35.1 ± 8.9
Gender, n (%)		
Male	20 (50.0)	20 (50.0)
Female	20 (50.0)	20 (50.0)
Marital Status, n (%)		
Single	11 (27.5)	10 (25.0)
Married	29 (72.5)	30 (75.0)
Weight (kg)[a]	64.20 ± 11.30	64.20 ± 10.90
Height (m)[a]	1.67 ± .10	1.68 ± .07
BMI (kg/m2)[a]	22.91 ± 3.88	22.80 ± 4.31
Underweight (<18.5)	6 (15.0)	7 (17.50)
Normal (18.5 - <23)	15 (37.50)	14 (35.0)
Overweight (23 - <27.5)	14 (35.0)	12 (30.0)
Obese (≥27.5)	5 (12.50)	7 (17.50)
SF-MPQ-2 scores[a]	4.17 ± 1.89	4.52 ± 2.06
RMDQ scores[a]	15.7± 7.03	15.67± 6.41
WHOQOL- BREF domainsa		
Physical Health	61.16 ±3.16	57.41 ±3.16
Psychological	65.93 ±21.34	64.89 ±17.26
Social Relationships	75.20 ±20.80	71.25 ± 20.58
Environment	62.42 ±23.36	57.96 ±13.37

[a] Values presented as mean ± standard deviation, RMDQ: Roland Morris Disability Questionnaire, BMI: Body Mass Index

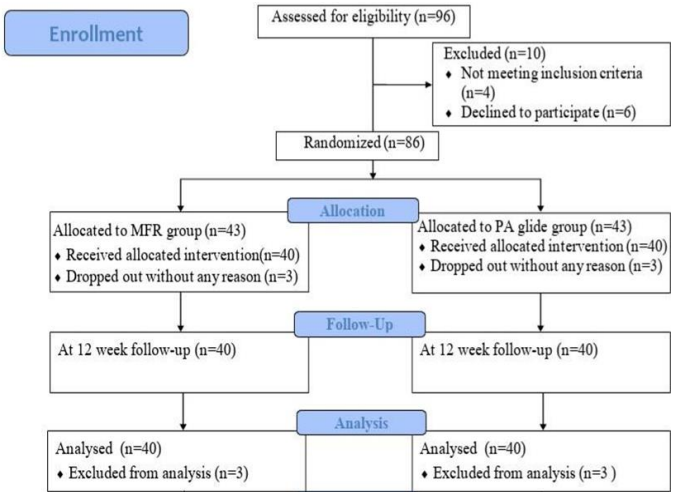

Figure 1. CONSORT flow diagram

Table 2. Comparison of pain and disability using total SF-MPQ-2 (0-24) and RMDQ scores (0-24) within groups

Pain and disability[b]	Post treatment minus baseline	Follow-up minus baseline	Follow up minus post treatment
SF-MPQ-2 (0-6) scores			
MFR group	1.65 (<.01)	1.85 (<.01)	.17 (.05)
PA glide group	1.92 (<.01)	2.10 (<.01)	.17 (.406)
RMDQ(0-24) scores			
MFR group	6.62 (<.01)	7.95 (<.01)	1.32 (.004)
PA glide group	5.95 (<.01)	7.90 (<.01)	1.95 (.006)

[b] Values presented as mean difference (p-value)

Table 3. Within group comparisons of WHOQOL-BREF (0-26)

Quality of life[b]	Post treatment minus baseline	Follow-up minus baseline	Follow up minus post treatment
Physical health			
MFR group	-23.20 (<.01)	-28.20 (<.01)	-5.0 (.04)
PA glide group	-27.80 (<.01)	-31.70 (<.01)	-3.90 (.02)
Psychological			
MFR group	-15.70 (<.01)	-21.0 (<.01)	-5.30 (<.01)
PA glide group	-19.40 (<.01)	-21.40 (<.01)	-2.0 (.25)
Social relationship			
MFR group	-9.80 (<.01)	-10.20 (<.01)	-0.42 (.71)
PA glide group	-14.0 (<.01)	-12.70 (<.01)	1.30 (.27)
Environmental			
MFR group	-12.70 (<.01)	-17.30 (<.01)	-4.70 (<.01)
PA glide group	-16.80 (<.01)	-19.50 (<.01)	-2.70 (.05)

[b] Values presented as mean difference (p-value)

Table 4. Between group comparisons of pain and disability using SF-MPQ-2 and RMDQ

Pain and disability[a]	MFR group	PA glide group	Mean difference (p-value)
SF-MPQ-2(0-6) scores			
Baseline	4.17 ± 1.89	4.52 ± 2.06	-.35 (.432)
Post-treatment at 6 weeks	2.52± 1.46	2.60± 1.54	-.07 (.825)
Follow-up at 12 weeks	2.35± 1.18	2.42± 1.48	-.07 (.804)
RMDQ (0-24) scores			
Baseline	15.70± 7.03	15.67± 6.41	-.02 (.987)
Post-treatment at 6 weeks	9.07 ±4.90	9.72±4.65	-.65(.545)
Follow-up at 12 weeks	7.75±3.91	7.77±4.06	-.025 (.978)

[a] Values presented as mean ± standard deviation

4. Discussion

The aim of research was to evaluate and compare the effects of MFR and PA glides on pain, disability, and quality of life using SFMPQ-2, RMDQ, and WHOQOL-BREF in patients with NSLBP. The current study found that both treatments are equally effective in treating pain, disability, and QOL in patients with NSLBP.

Both groups showed statistically equal effects in reducing pain using SFMPQ-2 after treatment and at follow-up. The study's results agree with the previous study which also showed no difference (Adelmanesh *et al*., 2012). As far as the authors know, no study has yet compared the MFR and PA glides in NSLBP, specifically. A study compared MFR and SNAGs, which is also a vertebral gliding different from PA glides, with results in line with the current study. Mulligan approach suggests, there are minute positional faults that result from injury or muscular imbalances. Thus, SNAG is proposed to reposition one articular surface to its corresponding surface with the movement. The positional fault is considered to be the pain generator and once this is corrected, it should lead to a reduction of pain with the resolution of muscle spasm around the affected joint. The study comparing MFR and SNAGs found both techniques equally effective in reducing pain among patients with NSLBP. The SNAGs and PA Glides are both mobilization techniques having the same effects, which may cause them to give the same results. The study was based on a short period with the primary objective to determine the feasibility of the study i.e. 1 week (4 sessions) to rule out the immediate and short-term effects of both techniques (Bhat *et al*., 2021). Another study reported a comparison of two mobilizations i.e. PA glides vs SNAGs and both were equally effective in reducing pain in NSLBP. That study used NPRS to measure

Table 5. Between groups comparison of QOL using WHOQOL-BREF

Quality of life[a]	MFR group	PA glide group	Mean difference (p-value)
Physical health			
Baseline	61.16 ± 21.9	57.41 ± 17.9	3.75 (.404)
Post-treatment at 6 weeks	84.37 ±17.1	85.17 ±16.7	-.80 (.83)
Follow-up at 12 weeks	89.37 ±16.4	89.10 ±19.8	.26 (.94)
Psychological			
Baseline	65.9 ± 21.30	64.9 ± 17.30	1.04 (.81)
Post-treatment at 6 weeks	81.66 ±17.0	84.27 ±13.50	-2.60 (.45)
Follow-up at 12 weeks	86.97 ±16.60	86.25 ±18.01	.72 (.85)
Social Relationships			
Baseline	75.20 ± 20.80	71.30 ± 20.60	3.96 (.395)
Post-treatment at 6 weeks	85.0 ±18.30	85.20 ±18.70	-.20 (.96)
Follow-up at 12 weeks	85.41 ±17.40	83.95 ±20.10	1.45 (.72)
Environment			
Baseline	62.40 ± 23.40	57.97 ± 13.40	4.453 (.299)
Post-treatment at 6 weeks	75.07 ±19.80	74.76 ±15.0	.31 (.93)
Follow-up at 12 weeks	79.76 ±17.70	77.50 ±18.60	2.26 (.57)

[a]Values presented as mean ± standard deviation (95% C.I)

pain and a small and unequal sample size i.e. 33 patients with group 1 receiving PA glides having 17 patients while group 2 receiving SNAGs had 16 participants (M. N. Ali, Sethi, & Noohu, 2019). The current study also found significant effects of PA glides but among a large sample with a different outcome tool, the SFMPQ-2. The additional findings related to remaining effects of reduced pain at follow-up.

This study provided GSE and thermotherapy as prophylaxis, as conventional treatment is an essential point. A study reported that for the management of LBP, GSEs must contain back, hamstring, and tensor fascia lata stretching within a pain-free range (Ohtsuki & Suzuki, 2012). A Cochrane review of RCTs described improved outcomes of heat wrap implementation in reducing pain in NSLBP in comparison with non-heat wrap application and concluded that the thermotherapy with exercise presented long term pain reduction (French *et al*., 2006). This study reported both interventions as equally beneficial to decrease disability using RMDQ and showed significant mean differences from baseline to the 6th week and 12th week of the study. Both groups also showed clinical significance by reaching a minimal clinically important difference of 4 points on RMDQ after treatment (Ogura *et al*., 2020). No statistical and clinically significant difference was found between the groups. Similarly, multiple studies reported that the PA glides decrease disability by various mechanisms. Studies reported PA glides to perform repositioning of collagen and break adhesions. This function leads to normal mobility of the spine, decreasing the fear of getting reinjured and disability (Baig *et al*., 2018 ; Khan *et al*., 2018 ; Shah & Kage, 2016). As per the author's knowledge, there is no prior research that compared MFR and PA glides on disability in NSLBP. Findings of the current study suggest use of both techniques to manage NSLBP. In terms of the patient's ease and better toleration of treatment, both minimize the total time and struggles put in by the therapist to procure equivalent results. The efficacy of both interventions is equally significant.

The limitations of the study include that blinding of therapists and patients was not done owing to the nature of the treatment interventions. The functional ability of the back muscles was not inspected. Thus, strength and physical performance must be inspected by objective measurement tools such as an isokinetic dynamometer in future studies. There were no multifactorial exercises. The patients were not characterized based on their unique characteristics which could have been ideal. However, both genders were equally selected. This study strengthens the claim that offering 18 supervised sessions of physical therapy is beneficial for NSLBP patients along with sustained effects at follow-up after 12 weeks. The study adopted all possible and updated guidelines that targeted the NSLBP.

5. Conclusions

The main conclusion of the current study is that neither one of the MFR and PA glides with general stretching exercises and thermotherapy is more effective than the other in improving pain, decreasing disability, and improving the quality of life of patients with NSLBP.

Author Contributions

Syeda Waniya Riaz: Conceptualization, Methodology, Investigation, Writing - Original draft. Syed Imran Ahmed: Data curation, Resources, Supervision. Aftab Ahmed Mirza Baig: Visualization, Methodology, Investigation, Writing - Reviewing and editing, Supervision. Waqas Ahmed Farooqui: Formal analysis, Visualization.

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