

COMPARATIVE EVALUATION OF TREATMENT DURATION AND PATIENT SATISFACTION AMONG FIXED APPLIANCE THERAPY, MYOFUNCTIONAL APPLIANCE AND CLEAR ALIGNER THERAPY (2023-2025): A RETROSPECTIVE QUESTIONNAIRE-BASED STUDY

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ABSTRACT

Two important factors that affect orthodontic treatment outcomes are the length of treatment and patient satisfaction. The effectiveness and patient-reported results of various orthodontic techniques might differ greatly.

Aim: To compare treatment duration and patient satisfaction between fixed appliance therapy, clear aligner therapy and myofunctional appliance therapy.

Materials and Methods: A comparison research using a retrospective questionnaire was carried out on 105 individuals who received care between 2023 and 2025. Patients were differentiated into three groups (n=35 each): Fixed appliances, Clear aligners and Myofunctional appliances. The length of treatment (months) was taken from records of the patients from the Department of Orthodontics. A 50-point Orthodontic Patient Satisfaction Index (OPSI) was used to evaluate patient satisfaction. The questionnaire was pre-tested on 10 patients to assess clarity and internal consistency. Pearson correlation and one-way ANOVA were used for statistical analysis.

Results: Clear Aligners (6.11 ± 1.11 months) had shorter mean treatment durations followed by Fixed appliance therapy (12.06 ± 2.01 months) and Myofunctional appliance therapy (15.86 ± 1.88 months). Most satisfied were the Clear Aligner group (90.06%) followed by Fixed appliances (70.12%) and Myofunctional appliances (46.18%). A statistically significant difference ($p < 0.001$) was observed. Treatment duration and satisfaction had a very strong negative correlation ($r = -0.93$).

Conclusion: Clear aligner therapy demonstrated short duration for treatment and provided superior patient satisfaction on the other hand fixed appliance modality followed by myofunctional therapy exhibit longer treatment duration and also showed low satisfaction.

KEYWORDS: Myofunctional, Clear Aligner, Fixed Appliance, Satisfaction Index, Treatment duration.

INTRODUCTION

The primary objectives of orthodontic treatment include long-term retention, facial aesthetics and superior functional integrity. With their own biomechanical concepts, indications and patient acceptance levels, various treatment modalities have emerged throughout time. Fixed appliance treatment is still the most often implemented and researched modality worldwide^[1]. In order to treat severe malocclusions including severe crowding, rotations and skeletal discrepancies, fixed orthodontic therapy provides three-dimensional control over tooth movement by continuous arch wire engagement^[2].

Depending on the degree of the malocclusion, patient cooperation, extraction procedures and biomechanics, complete fixed appliance modality for moderate to severe generally takes 18 to 24 months for completing and treating the malocclusion^[3]. Issues like white spot lesions, root resorption and decreased patient compliance may erupt due to long-term treatment modality, even after achieving precise and successful outcomes^[4,5].

Aligners rely on multiple thermoplastic trays to achieve controlled tooth movement, which were first commercially available in the late 1990s^[6]. According to various studies, aligners can reduced the duration of

treatment by 12 to 18 months for mild to moderate malocclusions^[7]. In addition to that aligners are related to superior oral hygiene status and patient comfort^[8]. But in treating complex malocclusions, opting clear aligners is questionable^[9].

On the counter part, myofunctional appliances are highly acceptable treatment modality for correcting skeletal problems in growing patients, especially in Class II malocclusions^[10]. During growth spurts, these devices alter neuromuscular function and encourage mandibular advancement^[11]. Before switching to fixed mechanotherapy, the functional phase might last nine to twelve months^[12]. Treatment time varies depending on patient compliance and development pattern, despite being helpful in correcting the skeleton during growth^[13].

A small number of retrospective departmental-level studies concurrently assess treatment duration and patient satisfaction across fixed, myofunctional and aligner treatments, despite the fact that many clinical trials compare particular modalities^[14]. In modern orthodontics, patient satisfaction has grown in significance since treatment acceptability is influenced by psychological variables and aesthetic expectations.^[15] Satisfaction levels are greatly impacted by elements including dental hygiene convenience, speech interruption, pain perception, and aesthetics^[16].

Hence, for evidence-based treatment planning, a retrospective comparative analysis evaluating treatment time and patient satisfaction across various orthodontic methods is clinically important^[17-20].

Aim

To evaluate the differences in patient satisfaction and treatment duration between clear aligners, fixed appliances, and myofunctional appliances.

Objectives

1. To analyze mean treatment duration among the three groups: Fixed, Myofunctional and Clear Aligners.
2. To evaluate patient satisfaction using Orthodontic Patient Satisfaction Index (OPSI).
3. To assess correlation between treatment duration and satisfaction.

MATERIALS AND METHODS

Study Design: Retrospective questionnaire-based comparative study.

Study Period:2023–2025

Sample Size:105 patients (35 per group)

Grouping

- Group I: Fixed Appliances (n=35)
- Group II: Clear Aligners (n=35)
- Group III: Myofunctional Appliances (n=35)

Inclusion Criteria

- Mild to moderate Malocclusion
- Completed orthodontic treatment
- Complete records available
- Satisfaction questionnaire completed

Patient satisfaction index (OPSI – 10 item scale)

The questionnaire was pre-tested on 10 patients to assess clarity and internal consistency

Each question scored 1–5 (Likert Scale):

1 = Highly Dissatisfied Patient

2 = Dissatisfied Patient

3 = Average Patient Review

4 = Satisfied Patient

5 = Highly Satisfied Patient

Domains:

1. Comfort during treatment
2. Esthetics (Appearance) of appliance
3. Speech difficulties during treatment
4. Oral hygiene status
5. Pain experience during treatment
6. Satisfaction with treatment duration
7. Communication with Doctor
8. Convenience of appointment frequency
9. Functional improvement
10. Overall satisfaction

Maximum Score = 50

Minimum Score = 10

Convert to percentage:

Satisfaction Percentage = (Total OPSI Score obtained / Maximum Score) $\times$ 100

OPSI maximum score is 50

Satisfaction Percentage = (Total Score / 50) $\times$ 100

Interpretation:

SCORE (%)	INTERPRETATION
80-100	HIGHLY SATISFIED
60-79	SATISFIED
40-59	MODERATE
<40	DISSATISFIED

Group I - Fixed Appliance (n=35)

PATIENT ID	TREATMENT MODALITY	DURATION REQUIRED	SATISFACTION INDEX
F1	FIXED	13	32
F2	FIXED	15	36
F3	FIXED	11	35
F4	FIXED	9	38
F5	FIXED	11	39
F6	FIXED	12	32
F7	FIXED	15	36
F8	FIXED	10	38
F9	FIXED	12	37
F10	FIXED	14	39
F11	FIXED	11	32
F12	FIXED	12	34
F13	FIXED	14	35
F14	FIXED	15	33
F15	FIXED	9	37
F16	FIXED	9	38
F17	FIXED	12	34
F18	FIXED	13	38
F19	FIXED	12	39
F20	FIXED	15	32
F21	FIXED	10	31
F22	FIXED	12	36
F23	FIXED	11	37
F24	FIXED	12	39
F25	FIXED	15	33
F26	FIXED	9	35
F27	FIXED	10	39
F28	FIXED	12	32
F29	FIXED	13	35
F30	FIXED	13	37
F31	FIXED	15	34
F32	FIXED	12	39
F33	FIXED	12	38
F34	FIXED	10	32
F35	FIXED	14	35

Group II - Clear Aligner (n=35)

PATIENT ID	TREATMENT MODALITY	TREATMENT DURATION	SATISFACTION INDEX
CA1	CLEAR ALIGNER	8	45
CA2	CLEAR ALIGNER	7	47
CA3	CLEAR ALIGNER	7	48
CA4	CLEAR ALIGNER	6	49
CA5	CLEAR ALIGNER	6	42
CA6	CLEAR ALIGNER	6	43
CA7	CLEAR ALIGNER	6	48
CA8	CLEAR ALIGNER	7	47
CA9	CLEAR ALIGNER	6	49
CA10	CLEAR ALIGNER	4	42
CA11	CLEAR ALIGNER	5	42
CA12	CLEAR ALIGNER	5	44
CA13	CLEAR ALIGNER	7	44
CA14	CLEAR ALIGNER	8	48
CA15	CLEAR ALIGNER	6	46
CA16	CLEAR ALIGNER	6	42
CA17	CLEAR ALIGNER	4	49
CA18	CLEAR ALIGNER	5	45
CA19	CLEAR ALIGNER	7	46
CA20	CLEAR ALIGNER	8	47
CA21	CLEAR ALIGNER	6	43
CA22	CLEAR ALIGNER	6	44
CA23	CLEAR ALIGNER	6	43
CA24	CLEAR ALIGNER	8	46
CA25	CLEAR ALIGNER	4	48
CA26	CLEAR ALIGNER	6	42
CA27	CLEAR ALIGNER	7	44
CA28	CLEAR ALIGNER	8	43
CA29	CLEAR ALIGNER	6	41
CA30	CLEAR ALIGNER	5	41
CA31	CLEAR ALIGNER	6	46
CA32	CLEAR ALIGNER	7	47
CA33	CLEAR ALIGNER	6	48
CA34	CLEAR ALIGNER	7	43
CA35	CLEAR ALIGNER	6	46

Group III - Removable Appliance (n=35)

PATIENT ID	TREATMENT MODALITY	DURATION REQUIRED	SATISFACTION INDEX
MA1	MYOFUNCTIONAL	15	26
MA2	MYOFUNCTIONAL	16	24
MA3	MYOFUNCTIONAL	15	24
MA4	MYOFUNCTIONAL	19	18
MA5	MYOFUNCTIONAL	15	23
MA6	MYOFUNCTIONAL	14	27
MA7	MYOFUNCTIONAL	19	17
MA8	MYOFUNCTIONAL	18	20
MA9	MYOFUNCTIONAL	13	24
MA10	MYOFUNCTIONAL	14	27
MA11	MYOFUNCTIONAL	16	28
MA12	MYOFUNCTIONAL	15	25
MA13	MYOFUNCTIONAL	13	26
MA14	MYOFUNCTIONAL	18	22

MA15	MYOFUNCTIONAL	13	22
MA16	MYOFUNCTIONAL	19	16
MA17	MYOFUNCTIONAL	14	21
MA18	MYOFUNCTIONAL	16	29
MA19	MYOFUNCTIONAL	18	19
MA20	MYOFUNCTIONAL	17	25
MA21	MYOFUNCTIONAL	19	15
MA22	MYOFUNCTIONAL	15	27
MA23	MYOFUNCTIONAL	13	23
MA24	MYOFUNCTIONAL	15	22
MA25	MYOFUNCTIONAL	16	27
MA26	MYOFUNCTIONAL	17	23
MA27	MYOFUNCTIONAL	17	22
MA28	MYOFUNCTIONAL	15	24
MA29	MYOFUNCTIONAL	16	24
MA30	MYOFUNCTIONAL	13	25
MA31	MYOFUNCTIONAL	15	22
MA32	MYOFUNCTIONAL	14	23
MA33	MYOFUNCTIONAL	15	28
MA34	MYOFUNCTIONAL	16	24
MA35	MYOFUNCTIONAL	18	19

Outcome Measures

1. Treatment Duration (months)
2. Orthodontic Patient Satisfaction Index OPSI (0–50 scale)

Statistical Analysis

- Descriptive statistics (Mean $\pm$ SD)
- One-way ANOVA
- Tukey post hoc test
- Pearson correlation

Significance level: $p < 0.05$

RESULTS

Treatment Duration

GROUP	MEAN $\pm$ SD (Months)
Fixed	12.06 $\pm$ 2.01
Clear Aligner	6.11 $\pm$ 1.11
Myofunctional	15.86 $\pm$ 1.88

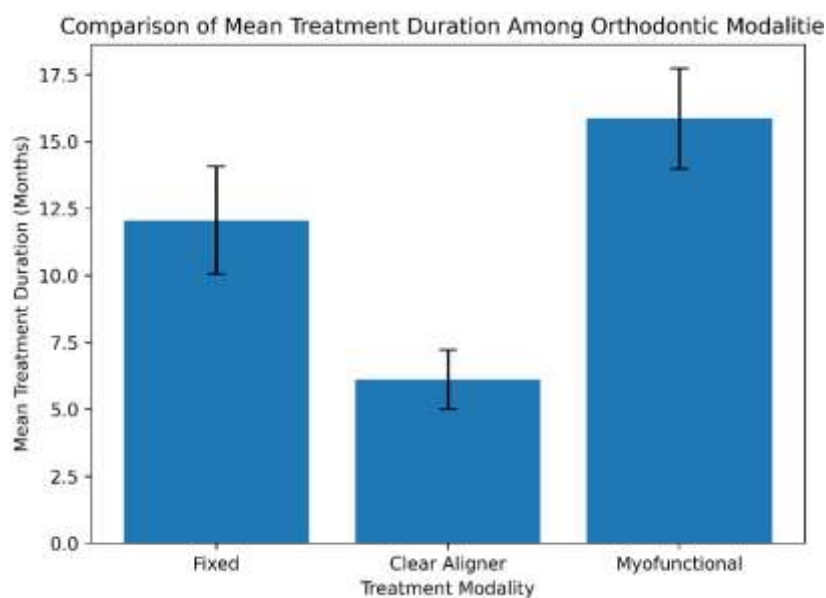
Source	SS	df	MS	F value	p value
Between Groups	1735.41	2	867.70	312.84	<0.001
Within Groups	282.79	102	2.77		
Total	2018.20	104			

SS = Sum of Squares; **df** = Degrees of Freedom; **MS** = Mean Square; **F** = F-statistic.

F value is 312.84

p < 0.001

Highly significant difference.



ANOVA showed statistically significant difference (p < 0.001).

Satisfaction Index

GROUP	MEAN ± SD	SATISFACTION %
Fixed	35.06 ± 2.54	70.12 %
Clear Aligner	45.03 ± 2.51	90.06 %
Myofunctional	23.09 ± 3.58	46.18 %

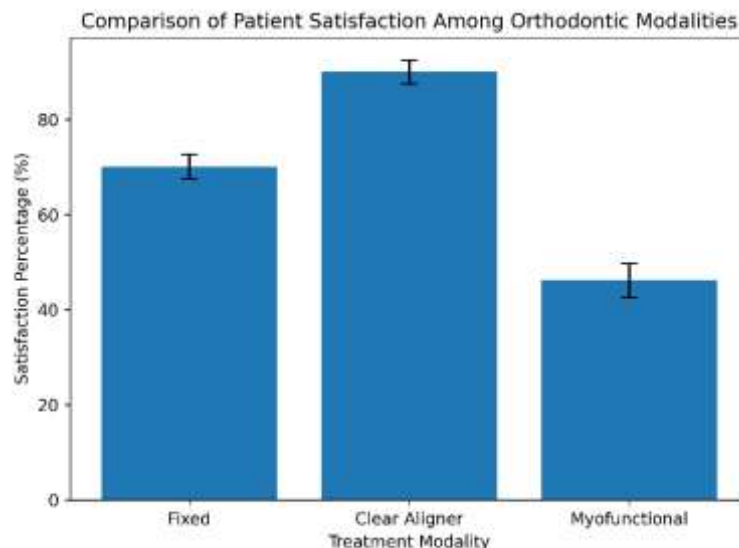
Source	SS	df	MS	F value	p value
Between Groups	8882.17	2	4441.08	471.62	<0.001

Source	SS	df	MS	F value	p value
Within Groups	959.58	102	9.41		
Total	9841.75	104			

F value is 471.62

$p < 0.001$

Extremely significant difference



Difference statistically significant ($p < 0.001$)

Correlation

Pearson correlation coefficient between duration and satisfaction:

$r = -0.93$ (Very strong negative correlation)

$p < 0.001$

DISCUSSION

This present retrospective study compared treatment duration and patient satisfaction among three orthodontic treatment modalities:- Fixed appliance therapy, Myofunctional appliances and Clear Aligner therapy.

Based on the departmental data provided the duration of treatment modality:

- Fixed appliance therapy: **12.06 ± 2.01 months**
- Clear aligner therapy: **6.11 ± 1.11 months**
- Myofunctional appliances: **15.86 ± 1.88 months**

Comparison of Treatment Duration

Fixed mechanotherapy required longer treatment time than clear aligners but lesser than myofunctional therapy. Fixed mechanotherapy typically required 18 to 24 months in moderate to severe conditions^[3] but the treatment duration decreased for mild to moderate malocclusions. The present study required lesser mean treatment duration (12 months) for completing the treatment due to selection of mild to moderate cases or efficient mechanotherapy protocols.

The treatment time for clear aligner therapy was noticeably shorter (6 months). Prior research showed that digital treatment planning and planned tooth movement staging can reduced the treatment duration in some moderate non-extraction cases^[7]. However treatment duration can increased due to complex procedures like extrusion and substantial torque control which has to be improved and evaluated initially^[9].

Due to the active functioning phase followed by fixed mechanotherapy, myofunctional appliance demonstrated highest period (4 + 12 months) as it exhibited orthopaedic remodelling along with orthodontic correction . According to the literature of growth modification, peak pubertal phase is paramount phase for orthopaedic correction using functional appliances^[11], as the overall duration is impacted by patient compliance and growth velocity^[13].

Patient Satisfaction

Clear Aligners exhibited superior patient satisfaction among these modalities followed by Fixed appliance therapy and Myofunctional appliances at last. This outcome demonstrated the consistency with the prior research showcasing that aligners improved aesthetic acceptability and decreased pain^[8,16].

Issues like mucosal irritation, greater initial pain perception and difficulty in maintaining oral hygiene are all linked to fixed appliances^[6]. These factors may contribute to decrease patient satisfaction despite providing better biomechanical control over tooth.

Due to bulkiness and speech interference^[12], aesthetic concerns and strong unacceptability towards myofunctional appliance followed by fixed appliance therapy this modality demonstrated least patient satisfaction.

Clinical Implications

The study reinforces that:

- Fixed appliances remain the gold standard for precise biomechanical control^[1,2].
- Clear aligners provide shorter duration and better satisfaction in selected cases^[7,8].
- Myofunctional appliances are effective during growth modification phases^[10,11].

Therefore, the degree of malocclusion, skeletal development, aesthetic objectives, and patient compliance should all be taken into account when choosing a treatment approach.

Limitations

- Retrospective design
- Department-based sample
- Lack of malocclusion severity categorization
- Growth variations in removable cases

Future prospective multicentric randomized trials are recommended to validate these findings.

CONCLUSION

1. Myofunctional therapy required longest treatment duration and showed lowest satisfaction.
2. Clear aligners proved highest satisfaction and shorter duration.
3. Fixed mechanotherapy provide excellent results in mild, moderate and severe malocclusions but need higher treatment time along with showed less satisfaction.
4. Treatment duration significantly impacted patient satisfaction.

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