# Comparison between actual hawley retainer wear time and self-reported declaration

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*Objectives:* The aim of the present study was to determine the compliance and adherence of patients to a prescribed retainer wear regimen measured via a sensor incorporated into a Hawley appliance and to compare the patient's actual wear time by a self-reported declaration.

*Methods:* The sample consisted of the records of 42 patients (mean age: 14.70 ± 1.99), monitored for their retention protocol compliance after the first week (T1), first month (T2), third month (T3) and sixth month (T4), following band removal. A Theramon microsensor was embedded into the mandibular retainer to record the actual wear time. Self-reported wear time was declared by the patients and was coded as; 1 = "less than 6 h", 2 = "6–12 h", 3 = "12–18 h", and 4 = "18–24 h". Actual wear time was tested at the different time points using a Repeated Measures ANOVA test. To assess the agreement between the self-reported and the actual wear times, McNemar and Weighted Kappa tests were applied. Additionally, a questionnaire was provided to address and track electronic wear-time.

*Results:* There were significant differences ($p < 0.05$) at each time point for the actual wear time. The highest mean wear time was 15.03 ± 4.75 at T1 and the lowest was 11.43 ± 5.47 h/day at the T4 period. The consistency of the actual and self-reported data was moderate at T1, T2, and the T4 periods, and good at T3.

*Conclusions:* Since self-reported wear time is not consistent compared with measured microsensor documentation, self-reported wear time should be considered cautiously.

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## Introduction

A retention protocol is a critical process in order to maintain an orthodontic treatment result. There is no universal agreement describing retention wear protocols for removable appliances. Many providers have indicated that it would be advantageous to wear these appliances for at least one year following fixed appliance removal.[1,2] However, patients are usually required to wear retainers after active orthodontic treatment for several years or even for a lifetime in order to minimise the risk of relapse.[3]

In orthodontic practice, Hawley and vacuum-formed retainers are the most commonly prescribed removable appliances.[4] The main disadvantage of removable retainers is the need for patient compliance,[5] which is an important determinant related to post-treatment stability.[6] A subjective evaluation of patient self-reported compliance and adherence is not reliable as shown by previous studies.[7–9] Using a microsensor embedded within a removable appliance is a new technology[10] and, by using this method, clinicians have been able to record and show wear-time data to patients at review appointments. It is therefore possible for a clinician to detect and compare patient compliance over a treatment and retention period.[11–13]

Theramon is a microsensor, which can be readily placed into the acrylic of removable appliances, such as a Hawley retainer, or even plastic appliances

such as vacuum-formed retainers.[13] Previous studies have investigated the objective measurement of wear times using a sensor incorporated into removable orthodontic appliances.[11–16] In addition, several studies[6,17] have evaluated patient compliance by only using questionnaires. However, there have been few studies[11,18] comparing an indirect and objective wear-time assessment of removable appliances. To the best of current knowledge, there is no study which has objectively compared measured wear times of a Hawley retainer with rating scales of patient self-reported wear time. Therefore, the first aim of the present study was to quantify patient wear compliance of a mandibular Hawley retainer and compare the patient's actual with the prescribed wear time over the first 6 months of an active retention period. A secondary aim was to identify the advantages and disadvantages of electronic wear-time monitoring and, via a questionnaire, evaluate the acceptance of the sensor by the patients. It was expected that the present study protocol would allow an assessment of the discrepancies between subjective and objective patient evaluation in relation to the retention phase of the orthodontic treatment by applying rating scales. The null hypothesis for the present study states that there is no difference between the actual and self-reported wear time for mandibular Hawley retainers.

## Materials and methods

Ethical approval for this retrospective trial was obtained from the research ethics committee of Hacettepe University (GO 17/572-25). The patients who were consecutively treated between January 2016 and January 2018 at the Department of Orthodontics of Hacettepe University consented and accepted the incorporation of a Theramon sensor into mandibular Hawley retainers after fixed appliance orthodontic treatment, and were recruited into the study. Each participant had more than 6 month's appliance use at the time of sample selection and were provided with a one-page questionnaire. To generate homogeneity of the study group, only the records for the wear of the mandibular Hawley appliance were selected for the study.

Of the 65 patients who had previously been followed for the retention protocol with a Theramon sensor, the data from 42 patients were available for the final analysis after the application of inclusion and exclusion criteria. The inclusion criteria were: 1. completed active orthodontic treatment and a retention protocol of maxillary and mandibular Hawley appliances with an integral micro-electronic sensor placed in the mandibular appliance; 2. Hawley appliance wear time for a period of at least 6 months or more; 3. had no other retainers such as an Essix or fixed retainer; 4. had complete records at the first week, first month, third month and sixth month; 5. provided a one page questionnaire which contained subjective data about the wear of the appliance, and which was previously completed at the check-up appointments. The exclusion criteria were: micro-electronic wear-time data unavailable because of technical problems ($n$ = 11), and the patient no longer attending follow-up appointments ($n$ = 12). None of the patients had syndromes, clefts or other systemic diseases that could effect the wear time of the retainer. The age of the recruited patients ranged between 11 and 19 years with a mean age of 14.70 ± 1.99 years at the beginning of the retention protocol. After "drop-outs", the study group consisted of 31 female (mean age: 11.77 ± 2.18 years) and 11 male (mean age: 15.15 ± 1.36 years) patients.

The data from all patients who had been monitored throughout the first 6 months at the first week (T1), first month (T2), third month (T3) and sixth month (T4), respectively, were collected from the clinic archive for evaluation. In accordance with the literature[19,20] and following the clinic's retention protocol, the patients had been instructed to wear the mandibular Hawley retainers "full time" (more than 18 h) for 6 months except while eating and brushing their teeth and thereafter for 6 months of part-time wear. Full time wear for the first 6 months was important and recommended since a fixed lingual retainer was not used, and remained an exclusion criteria for the present study.

A Theramon sensor (Handelsagentur Gschladt, Hargelsberg, Austria) was placed and embedded, during appliance fabrication, into the posterior part of the mandibular plate between the second premolar and first molar. At each review appointment, stored wear time data was transferred by the software (Theramon software, version 2.1.0.13), which provided a graphical screen display of the data (Figure 1). Wear time data for all patients were documented and printed for the first 6 months of the active retention period.

The acceptance of the Hawley retainer incorporating the Theramon sensor had also been evaluated by a

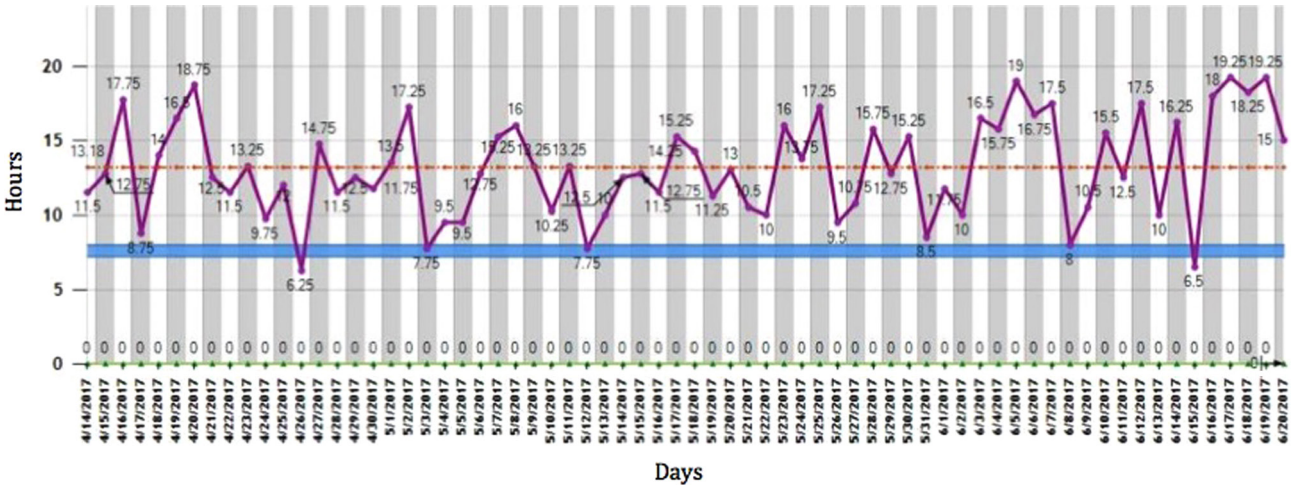


Figure 1. Wear time graphs of a patient in which daily wear time is indicated by the purple line, and mean wear time by the red dotted line. (The 8-h band does not indicate the recommended wear time but appears as part of the software.)

self-reporting questionnaire including 6 questions based on published literature (Table I). The questionnaire data for each patient was collected from the archived clinical file. Each patient was asked for information regarding the impact of the sensor on their retention protocol, and further, provide reasons for not wearing the retainers as instructed. The survey in relation to the impact of sensor (questions 1, 2, 3, 4, and 5) was compiled based on Schott et al.'s questionnaire.[15] The last question (question 6), including the reasons for not wearing the retainers, was based on Pratt et al.'s questionnaire[6] and patients were free to check more than one item in response. The questions were completed at the last appointment (at T4) during which the patients were not aware of the actual wear time measured by the sensor.

For the purpose of comparative statistical analysis, rating scales for the patient's self-reported wear time intervals were coded as; 1 = "less than 6 h", 2 = "between 6–12 h", 3 = "between 12–18 h", and 4 = "between 18–24 h". The rating scales were completed by each patient, at each appointment (T1, T2, T3, and T4) in order to detect their self-reported wear time. During the declaration, neither the practitioner nor the patient was aware of the actual wear time measured by the sensor. This was subsequently assessed by the Theramon software program and reported to the patient.

### *Statistical analysis*

The data were analysed using IBM SPSS Statistics Version 21.0. Data were presented as means and standard deviations (Mean ± SD) for descriptive variables, and number (%) for categorical variables. Actual wear times of the study group at each appointment were tested for significant differences using the Repeated Measures ANOVA test. A Bonferroni correction was used to counteract the problem of multiple comparisons. To assess the agreement between self-reported and actual wear times, data were compared using McNemar–Bowker and Weighted Kappa tests. Weighted Kappa values were categorised as "very good" when the value was above 0.8, "good" when it was between 0.6 and 0.8, "moderate" when it was between 0.4 and 0.6, "fair" when it was between 0.2 and 0.4 and "poor" when the value was between 0 and 0.2 as suggested by Landis et al.[21] For all tests, $p$ levels < 0.05 were regarded as significant and $p$ levels < 0.01 as highly significant. Qualitative variables were represented as frequency-%.

## Results

### *Analysis of wear time data*

The mean actual wear times at the follow-up appointments are shown in Table II. During an observation period of 180 days, the patients' actual mean wear times were 15.03 ± 4.75, 13.68 ± 5.69, 12.54 ± 5.65 and 11.43 ± 5.47 h/day, respectively, for the T1, T2, T3, and T4 appointment periods. There were statistically significant differences between the different time points for the actual wear time of the study group (Table II, $p$ = 0.002 for T2–T3 comparison, and $p$ < 0.001 for T1–T2, T1–T3, T1–T4, T2–T4 and T3–T4 comparisons). Actual wear time showed

Table I. Answers to questions regarding feelings about discomfort, sensor-fitted removable retainer, electronic wear time tracking, effects of wear time tracking on the success of retention protocol, and the reason of not using the appliance.

| | Number of replies | Frequency (%) |
|---|---|---|
| 1. Do you feel discomfort associated with the sensor? | | |
| (1) All the time | 1 | 2.4% |
| (2) Never | 26 | 61.9% |
| (3) Sometimes (pressure, friction, surface irregularities) | 15 | 35.7% |
| 2. If Theramon sensor comprised discomfort; did this factor affect your wear time? | | |
| (1) Yes it affected | 3 | 7.1% |
| (2) No, it did not affect | 39 | 92.9% |
| 3. Wear time tracking is…. | | |
| (1) Useless for patients? | 2 | 4.8% |
| (2) Annoyingly intrusive? | 2 | 4.8% |
| (3) Capable of improving wear times? | 22 | 52.4% |
| (4) Only a scientific experiment? | 16 | 38.1% |
| 4. Wear time tracking… | | |
| (1) Improves the success of the treatment? | 26 | 61.9% |
| (2) Does not influence the success of treatment? | 5 | 11.9% |
| (3) Comprises the success of the treatment? | 0 | 0% |
| (4) Makes treatment uncomfortable? | 2 | 4.8% |
| (5) No opinion | 9 | 21.4% |
| 5. What do you feel about wear-time sensor? | | |
| (1) They are super! | 8 | 19% |
| (2) They are useless, did nothing for me | 6 | 14.3% |
| (3) I recommend them | 12 | 28.6% |
| (4) I do not recommend them | 9 | 21.4% |
| (5) They should not be used | 1 | 2.4% |
| (6) They should be used routinely in orthodontics | 6 | 14.3% |
| 6. If you are not wearing the retainers as often as you were instructed, which of the following reasons contribute to this? (Multiple boxes could be checked) | | |
| (1) I did not like the way it looked | 4 | 9.5% |
| (2) Bad feel when I wore it | 7 | 16.7% |
| (3) I forgot to wear it | 7 | 16.7% |
| (4) I lost my retainer | 0 | 0% |
| (5) My retainer was broken | 0 | 0% |
| (6) My retainer did not fit my mouth any more | 0 | 0% |
| (7) It made me hard to talk | 19 | 45.2% |
| (8) I did not want to wear it during social activities | 19 | 45.2% |
| (9) None | 1 | 2.4% |

Table II. Overview of the actual wear times (Hours per Day) (mean ± SD) and differences for each appointment (T1, T2, T3, T4).

| | | %95 Confidence interval | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Appoint time | Mean actual wear time (Mean ± SD) | Lower bound | Upper bound | *T1–T2 p* | *T1–T3 p* | *T1–T4 p* | *T2–T3 p* | *T2–T4 p* | *T3–T4 p* |
| T1 | 15.03 ± 4.75 | 13.55 | 16.51 | <0.001 | <0.001 | <0.001 | 0.002 | <0.001 | <0.001 |
| T2 | 13.68 ± 5.69 | 11.91 | 15.45 | | | | | | |
| T3 | 12.54 ± 5.65 | 10.78 | 14.30 | | | | | | |
| T4 | 11.43 ± 5.47 | 9.73 | 13.14 | | | | | | |

Repeated measures ANOVA with Bonferroni correction used for adjustment for multiple comparisons, T1:1.week, T2:1.month, T3:3.month, T4:6.month. Significant values ($p < 0.05$).

a time-dependent decreasing pattern as shown in Figure 2. The graph in Figure 3 shows the characteristic wear-time pattern for the patients over the 180 days.

An evaluation of the wear time by all participants over the six months demonstrated that, 31%, 28.6%, 23.8%, and 21.4%, respectively, of the patients wore the retainer between 18 and 24 h as instructed at T1, T2, T3 and T4 time points (Table III).

The self-reported and actual wear time numerical categorisation comparison indicated an agreement frequency above 50% for all appointment times, and the significance value was greater than .05 according to the McMemar test. A weighted Kappa statistic showed that the agreement of the self-reported wear time declared by the patients and the measured actual wear time by the practitioner was moderate for T1 (kappa = 0.405), T2 (kappa = 0.520) and T4 (kappa = 0.550) periods, and good for T3 (kappa = 0.603) (Table IV). In addition, the mean actual wear time for the patients, who did not consider the appliance to cause discomfort and thought that it did not affect the use of the appliance, was evaluated. The mean wear time of these patients (n=26 patients) did not reach the instructed wear time, which was in the range of 11.61 ± 5.34 and 15.11 ± 4.70 h/day between T1–T4 time points with a statistically significant time-dependent decreasing pattern (Table V).

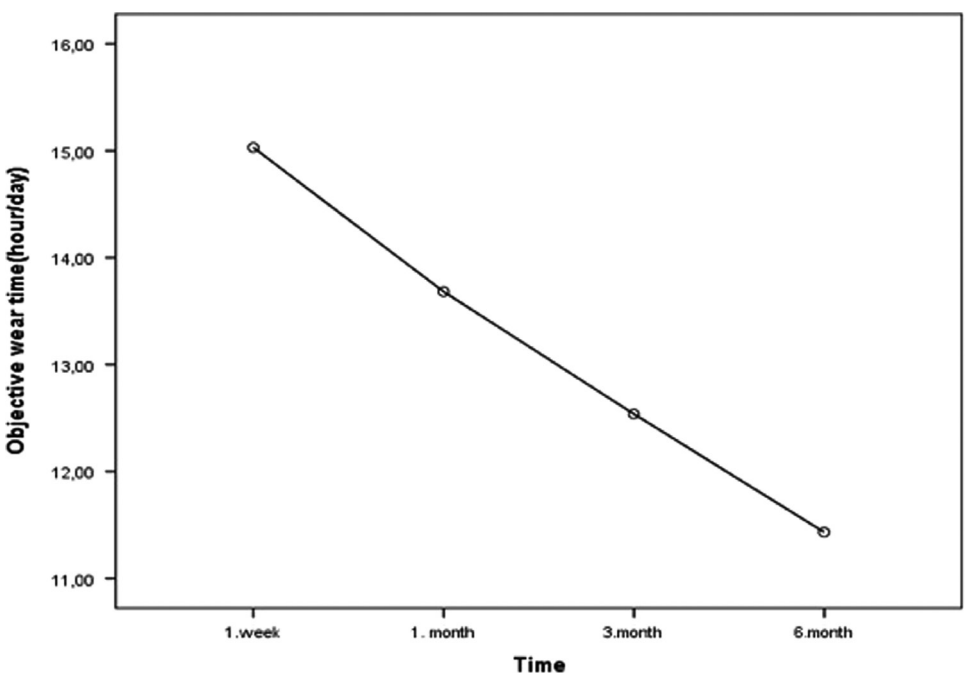


Figure 2. Graphical section, showing the mean actual wear time.

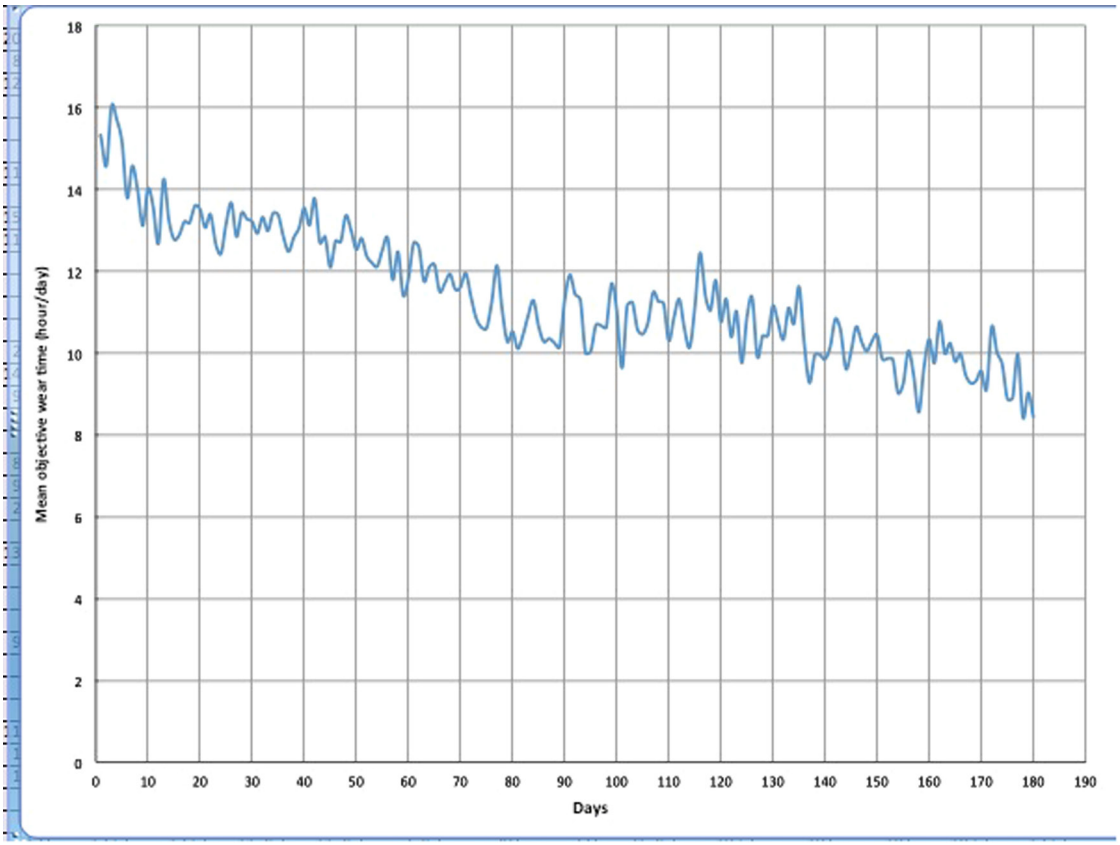


Figure 3. Graphical section, showing the mean objective wear time for 180 days.

Table III. Frequency of the patients according to numerical categorization wear time for actual and self-report measurement hours for each appointment time. (The categorization is based on "Actual" wear time).

| Evaluation type | Numerical categorization | T1 N (%) | T2 N (%) | T3 N (%) | T4 N (%) |
|---|---|---|---|---|---|
| Actual | 1(<6 h) | 1 (2.4%) | 4 (9.5%) | 2 (4.8%) | 8 (19%) |
| | 2 (6–12 h) | 10 (23.8%) | 13 (31%) | 18 (42.9%) | 20 (47.6%) |
| | 3 (12–18 h) | 18 (42.9%) | 13 (31%) | 12 (28.6%) | 5 (11.9%) |
| | 4 (18–24 h) | 13 (31%) | 12 (28.6%) | 10 (23.8%) | 9 (21.4%) |
| Self-report | 1(<6 h) | 1 (2.4%) | 1 (2.4%) | 2 (4.8%) | 3 (7.1%) |
| | 2 (6–12 h) | 11 (26.2%) | 13 (31%) | 15 (35.7%) | 18 (42.9%) |
| | 3 (12–18 h) | 16 (38.1%) | 11 (26.2%) | 14 (33.3%) | 9 (21.4%) |
| | 4 (18–24 h) | 14 (33.3%) | 17 (40.5%) | 11 (26.2%) | 12 (28.6%) |

1 = <6 h, 2 = between 6–12 h, 3 = between 12–18 h, 4 = between 18–24 h. N (%) = Patient number (frequency). T1:1.week, T2:1.month, T3:3.month, T4:6.month.

### *Analysis of the questionnaire*

The majority of the patients (61.9%) did not experience any discomfort associated with the sensor, compared to 15 respondents (35.7%) who reported sensor-related discomfort associated with pressure, friction or surface irregularities. Only one respondent (2.4%) reported that the sensor consistently created discomfort.

The opinions related to the feelings about wear time tracking revealed that 52.4% of the patients felt electronic tracking was capable of improving wear time. However, 38.1% of the patients considered procedures

Table IV. Comparison between actual and self-report numerical categorization wear time for each appointment time (T1, T2, T3, T4).

| Appointment time | N/T (%) Agreement frequency | $p^a$ | Weighted Kappa Value | $p^b$ |
|---|---|---|---|---|
| T1 | 23/42 (54.8%) | 0.225 | 0.405 | 0.002 |
| T2 | 25/42 (59.5%) | 0.231 | 0.520 | <0.001 |
| T3 | 27/42 (64.3%) | 0.797 | 0.603 | <0.001 |
| T4 | 23/42 (54.8%) | 0.050 | 0.550 | <0.001 |
| Kappa categorization: | | | | |
| <0.20 | Poor | | | |
| 0.21–0.40 | Fair | | | |
| 0.41–0.60 | Moderate | | | |
| 0.61–0.80 | Good | | | |
| 0.81–1.00 | Very good | | | |

*N* = number of the patients whose objective and self-report evaluation numerical score was the same. T = Total number of the patients. N/T = agreement frequency according to McMemar Test $p^a$ = significance value for McMemar-Bowker Test $p^b$ = significance value for Weighted Kappa test

Table V. In the patient group (*n* = 26 patients) who stated that the appliance did not cause discomfort and did not affect the use of the appliance when placed, the mean actual wear time at each appointment and time dependent changes.

| | | %95 Confidence interval | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Time | *Actual wear time (N* = 26 patients) (Mean ± SD) | Lower bound | Upper bound | T1–T2 p | T1–T3 p | T1–T4 p | T2–T3 p | T2–T4 p | T3–T4 p |
| T1 | *(N* = 26) 15.11 ± 4.70 | 13.21 | 17.01 | 0.030* | 0.011* | <0.001* | 0.053 | 0.001* | <0.001* |
| T2 | *(N* = 26) 14.00 ± 5.33 | 11.85 | 16.15 | | | | | | |
| T3 | *(N* = 26) 12.80 ± 5.33 | 10.65 | 14.95 | | | | | | |
| T4 | *(N* = 26) 11.61 ± 5.34 | 9.45 | 13.76 | | | | | | |

Repeated measures ANOVA with Bonferroni correction used for adjustment for multiple comparisons. T1: 1.week, T2: 1.month, T3: 3.month, T4: 6.month. **Significant Values (P* < .05).

as a scientific experiment. The awareness of wear time tracking contributed to the success and diminished concerns regarding the effect on treatment in 61.9% of the patients. The wear time sensor was recommended by 28.6%, while it was not recommended by 21.4% of the patients. The questionnaire demonstrated that only one patient (2.4%) stated that sensor should not be used during the retention progress.

The most common reasons for stopping retainer wear were; "It made it hard to talk" (45.2% of the patients), and "I did not want to wear it during social activities" (45.2% of the patients) (Table I).

## Discussion

As an important aspect of treatment, it is essential for clinicians to objectively monitor the compliance and adherence of patients who wear removable appliances. With wear instructions ranging from 8 h to 15 h per day in patients aged between 6 and 16 years several authors have used microsensors to study patient compliance associated with various types of orthodontic appliances.[11–14,16,22,23]

The present study was the first to objectively compare measured wear times over different time intervals. Since instability tends to be more prevalent in the mandibular anterior region due to treatment-induced and physiological changes,[24] it was decided to assess only the data of patients who wore mandibular Hawley appliances including a microsensor during the retention period. Estimates related to the duration of appliance wear may be varied by the patients, parents or orthodontist, and patients may report exaggerated appliance wear as shown by

previous studies.[9,25] In this context, it is considered that the present study would reveal the actual data, and significantly contribute to the literature on the authenticity of patient statements regarding appliance use.

Although the patients were told that an increase in the duration of retainer wear would positively effect the retention phase, the duration of appliance wear did not substantially increase over time. On the contrary, retainer-wear time showed a decreasing pattern. It has been previously shown in several studies that most patients do not adhere to the period of wear defined by the clinician and do not attain the prescribed duration.[11,14,26] Tsomos et al.[13] instructed 24 patients to wear passive retainers (Hawley and Essix) with a prescription of 8 h/day. It was found that the patients' actual median wear time was 9.00 h/day, which was longer than the recommended time. Schott et al.[14] evaluated Hawley and functional appliance retainers in patients who were treated in independent clinics during a retention phase of up to 15 months. The study's combined data indicated a median wear time of 7 h per day, which was lower than the mean wear time (11.43 ± 5.47) revealed in the present study. The differences in mean wear time found in the earlier studies might be related to different wear time prescriptions, which was greater and almost "full time" for the present study.

Hyun et al.[5] followed 22 patients who were divided into an 'aware' and 'un-aware' group. According to the results, the 'aware' group wore their retainers more than the 'un-aware' group. Ackerman and Thornton[27] also showed that patients who were informed about the recording of wear time increased their time an average of 2.3 h more per day compared with those who were not informed. Perhaps a reduction in the average daily duration would have been found in the present study, if the patients were unaware that they were being monitored by a sensor. Although the patients in the present study knew that their compliance was being assessed, few reached the prescribed wear time. Patient compliance below the expected level may be due to outside influences such as social activities, personal preferences, possible dissatisfaction with the treatment, and the type of retainer preferred.

For the purpose of comparative analysis, the recordings of actual wear-time data were downloaded after the patient completed the subjective rating scale. After the self-reported declaration, the patient and the practitioner were aware of the actual wear time. According to the Weighted Kappa test, the agreement was mostly at the level of 'moderate' and therefore not great. It is assumed that the patients overestimated their actual wear times when reporting to the clinican. Pauls et al.[11] retrospectively examined 32 patients wearing removable appliances with embedded microsensors and discovered that there was a significant difference between subjective and objective wear time when the patients did not know that they were being assessed. However, the patients became more realistic once they knew their wear time was being monitored. In a recent study,[18] it was emphasised that the wear time declared by the patients would not be sufficient to assess the actual duration of use in agreement with the present results. Therefore, indirect wear time evaluation cannot be strictly recommended as a reliable method when compared to the recent microsensor documentation.

According to the questionnaire results of the present study, 38.1% of the patients considered wear-time tracking as a scientific experiment. However, most patients felt that microsensor tracking improved the success of the treatment and was capable of improving wear time. Schott et al.[15] surveyed the concerns of the patients' in relation to wear-time tracking using a sensor. Similar to the present results, the majority of respondents had a favourable impression of the installed sensor, and believed that tracking enhanced compliance along with the success of the treatment. Therefore, it may be considered that wear-time tracking can be beneficial to compliance and persuade patients to take the prescribed wear-times more seriously. A further questionnaire study[28] assessed the attitude of young patients who were treated by removable appliances. In contrast to the present results, the acceptance of a removable appliance incorporating a sensor was low and most stated that they would only wear an appliance if the treatment period could be shortened. According to the results of the present study, the majority of the patients (61.9%) did not feel any discomfort associated with the sensor. Hyun et al.[5] also surveyed the overall comfort of the retainers and, similar to the present results, most (89%) had a positive experience and found the Hawley retainers with an embedded microsensor, comfortable. Similarly in a study by Schott et al.,[15] most of the patients (108 respondents, 86.4%) reported that an installed sensor within an active

removable plate or functional orthopaedic appliance did not cause discomfort. The mean wear time for the patients who stated that they were comfortable wearing an appliance ($n$ = 26 patients) did not reach the prescribed wear time as presented in Table V, and showed a time-dependent decreasing pattern. When a microsensor is embedded into a Hawley appliance, the thickness of the acrylic is increased and becomes greater than 2 or 3 mm.[5] Because of the increased appliance thickness, difficulties may be experienced by the patients during retainer wear. In the present study, a common reason for stopping wear was speech difficulty, which may be related to the thickness caused by the embedded sensor. In addition, patients did not wear the retainer because "I did not want to wear it during social activities". This can be related to speech difficulty caused by the bulky sensor and a possible lower level of self-confidence associated with the appearance of the retainer as shown by Hichens et al.[29] and Saleh et al.[30]

The results of the present study confirm that, patients do not comply and adhere to prescribed wear times and a subjective assessment via a patient interview is likely insufficient for an accurate assessment. From a clinical perspective, it may be considered that, by sensor registration of the retention appliance, the clinician can identify potential problems associated with co-operation and therefore determine an individualised approach for care.

The present study involved a small group of patients treated in an academic setting, which may be considered a limitation of the study, and cause difficulty in generalising the results to clinical practice. However, retention studies are a challenge since reviewing participants in the long-term is practically and financially difficult. In addition, under-reporting of the Theramon microsensor as shown by Brierly et al.[31] could be considered as a further limitation. However, the study[31] was conducted on only five non-patient volunteers who produced limited data. In addition to these limitations, the retention protocol may be deemed a confounding bias in this study as lower bonded lingual retainers would be commonly preferred in the mandibular arch. However, clinicians may also consider using a lower Hawley retainer especially in patients with poor oral hygiene,[32,33] in patients who need posterior occlusal settling and a better interdigitation after active orthodontic treatment,[34] and to maintain arch width changes in patients who had lateral expansion during the course of treatment.[35]

## Conclusions

Since patient self-reported wear time is not consistent with actual microsensor data, self-reported wear time should be considered cautiously. It is concluded that patients overestimate their actual wear time, which means that actual wear times are lower than self-reported wear times.

## Conflict of Interest

The authors declare that there is no conflict of interest.

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