

## Comparison of Oral Health Impact Profile index and Oral Index of Daily Performance as predictors of quality of life of patients with orofacial pain

### Porównanie kwestionariusza Profilu Wpływu Zdrowia Jamy Ustnej (OHIP) i Wskaźnika Wpływu Jamy Ustnej na Życie (OIDP) jako czynników prognozujących jakość życia pacjentów z bólem twarzoczaszki

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#### Abstract

**Introduction.** Oral health-related quality of life instruments were developed separately to assess quality of life with added advantage of patient feedback. Aim of the study. To determine the reliability of OHIP and OIDP as predictors of quality of life (QoL) of patients with orofacial pain (OFP). **Methods.** Survey of QoL of patients at a dental clinic. A 14-item OHIP and 10-item OIDP questionnaires were submitted to patients seen during the study period. The questionnaires also included pain diagnosis and measurement of pain using the Visual Analogue Scale. The data were analyzed using SPSS version 20. Reliability of instruments was tested with Cronbach's alpha. ( $P$  value was at  $\leq 0.05$ ). **Results.** Two hundred and ninety-five respondents participated. Mean age was  $39.8 \pm 18.1$  years, mean VAS  $5.5 \pm 2.9$ , the prevalence, extent and mean severity score of OHIP-14 were 64.7%,  $2.8 \pm 3.6$  and  $17.8 \pm 12.6$ , respectively. The OIDP surface count (SC) and OIDP Additive (ADD) were 70.2% and  $16.98 \pm 21.93$ , respectively. VAS, OHIP and OIDP showed low, positive but significant correlation. Cronbach's alpha reliability indices for OHIP and OIDP were 0.93 and 0.94, respectively. Both instruments showed significant impact of OFP on eating, (OHIP  $p = 0.002$ , OIDP

#### Streszczenie

**Wstęp.** Narzędzia badawcze do oceny jakości życia, na które wpływa zdrowie jamy ustnej, powstały oddzielnie z dodanym elementem informacji od pacjenta. **Cel pracy.** Ustalenie wiarygodności OHIP i OIDP jako czynników prognozujących jakości życia (QoL) pacjentów z bólem twarzoczaszki (OFP). **Metody.** Analiza jakości życia pacjentów zgłaszających się do gabinetu dentystycznego. Czternastopunktowy kwestionariusz OHIP i dziesięciopunktowy OIDP zostały przedłożone pacjentom w czasie prowadzonego badania. Kwestionariusze dodatkowo dotyczyły diagnozy i pomiaru bólu poprzez zastosowanie VAS. Dane poddano analizie posługując się SPSS version 20. Wiarygodność narzędzi przebadano za pomocą testu alpha Cronbacha (wartość  $P \leq 0,05$ ). **Wyniki.** Badaniem objęto łącznie 295 uczestników (średni wiek  $39,8 \pm 18,1$  lat, średnia VAS  $5,5 \pm 2,9$ , wynik OHIP-14 co do występowania, zakresu i średniego nasilenia to 64,7%, odpowiednio  $2,8 \pm 3,6$  i  $17,8 \pm 12,6$ . The OIDP SC i OIDP Additive (ADD) wynosiły odpowiednio 70,2% i  $16,98 \pm 21,93$ . VAS, OHIP i OIDP wykazały niską, dodatnią lecz istotną zależność. Wyznaczniki wiarygodności Cronbacha dla OHIP i OIDP wyniosły odpowiednio 0,93 i 0,94. Obydwa narzędzia ujawniły

#### KEYWORDS:

OHIP, OIDP, quality of life, orofacial pain, validity

#### HASŁA INDEKSOWE:

OHIP, OIDP, jakość życia, ból twarzoczaszki, trafność

$p=0.003$ ), sleeping (OIDP,  $p=0.004$ ), and diet (OHIP,  $p=0.014$ ). **Conclusion.** Both instruments showed high reliability and validity indices in assessing impact of FP on the quality of life among affected individuals.

znaczny wpływ bólu twarzoczaszki na przyjmowanie pokarmu: (OHIP  $p=0,002$ , OIDP  $p=0,003$ ), spanie (OIDP,  $p=0,004$ ), i sposób odżywiania (OHIP,  $p=0,014$ ). **Wniosek.** Obydwa wskaźniki wykazały wysoką wiarygodność i trafność w ocenie wpływu bólu twarzoczaszki na jakość życia u osobników dotkniętych tą przypadłością.

## Introduction

Orofacial pain (OFP) is one of the most common regional pains. Despite the increasing number of various studies focusing on quality of life (QoL), relatively little is known about how oral conditions affect people's feelings of wellbeing.<sup>1</sup> Measurement of the impact of oral conditions on QoL should, however, be part of the evaluation of oral health needs because clinical indicators alone cannot describe the satisfaction or symptoms of dental patients, or their ability to perform daily activities.

The two most successful, internationally accepted and frequently used Oral health-related QoL instruments are Oral Impact on Daily Performance (OIDP) scale, and Oral Health Impact Profile (OHIP),<sup>2,3</sup> which were developed to assess quality of life with added advantage of patient's feedback. These scales were developed separately based on Lockers model<sup>4</sup> to assess oral impacts that have a serious influence on an individual's daily activity.

The present study is a follow up to previous OFP studies<sup>5,6</sup> with findings of high OFP prevalence and OFP as the major reason for presentation at the study center. Therefore, this study aimed to determine the utility, validity and reliability of these two instruments (OHIP and OIDP) as predictors of QoL of OFP patients.

## Methodology

A 6-month cross-sectional survey of QoL of patients attending a tertiary dental clinic of the University College Hospital, Ibadan, which is a major referral tertiary hospital in the South-Western part of Nigeria. In the conduct of this survey, the guidelines of ethical consideration were strictly adhered to and consent was obtained from participants.

A structured interviewer submitted 14-item OHIP and Modified 10-item OIDP questionnaire instruments to consecutive and consenting patients that presented at dental outpatient clinic during the study period. The cases seen were grouped into categories namely: infective conditions (odontogenic and non odontogenic), caries-related cases, periodontal diseases, neoplasms, stress disorders/apthous ulcers, lesions of neural origin, temporomandibular pain dysfunction disorders, jaw fractures and immunological disorders.

Questionnaire items also included socio-demographic data, pain diagnosis and measurement of pain at presentation using Visual Analogue Scale.

## Instruments

The information about the oral condition that led to presentation was obtained, and after clinical examination the impact of the condition on quality of life was recorded for the two instruments: OHIP-14 and OIDP.

The OHIP-14 comprised fourteen items to explore seven dimensions of impact (functional limitation, pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap) and participants responded to each item according to frequency of impact on a 5-point Likert scale ranging from never to very often.

The OIDP assessed the impacts of oral conditions on the abilities of individuals to perform ten daily activities. For each activity, the severity and the frequency of each impact were recorded on a Likert scale.

The Questionnaire items also included socio-demographic data, pain diagnosis and measurement of pain at presentation using VAS.

Prevalence of OHIP is the number of respondents

that reported one or more impact fairly often or very often. The extent is the number of impacts that were reported as 'fairly often' or 'very often', and the severity is the total number of impacts reported in the fourteen items.

OIDP Simple Surface Count (OIDP SC), which is OIDP prevalence, was calculated by dichotomizing the scores to yield the categories (0) "no daily performance affected" and (1) "at least one daily performance affected". The percentage of those with at least one daily performance formed the prevalence of OIDP. OIDP additive score (OIDP ADD), which is the severity, was calculated based on the Performance scores for each of the activities included in the index (eating, speaking, sleeping, etc). The Performance score is equal to the frequency score multiplied by the severity score. The frequency score is expressed on a scale of 0-5 and the severity score on a scale of 0-3, therefore each performance score ranges from 0-15. The overall OIDP performance score for each person was calculated as the sum of the performance score divided by the maximum total score obtainable multiplied by 100.

Construct validity was assessed by correlating a self-reported disease severity instrument of VAS with the severity outcomes of OHIP-14 and OIDP.

The data were analyzed using SPSS version 20 and summarized using frequency, mean, standard deviation and percentages. Reliability of the two instruments was tested with Cronbach's alpha while non-parametric tests (Mann-Whitney test, Kruskal-Wallis) were used for validity. P value was set at  $\leq 0.05$ .

## Result

A total of 295 respondents participated in the study comprising of 158 females and 137 males giving a ratio of 1.2:1. The mean age of the participants was  $39.8 \pm 18.1$  years and there was no significant difference in the mean age of males and females ( $p=0.5$ ).

### **Prevalence and level of impact:**

The prevalence, extent and mean severity score of OHIP-14 were 64.7%,  $2.8 \pm 3.6$  and  $17.8 \pm 12.6$ , respectively. Forty-four (14.9%) participants

reported only one item with impact "fairly often" or "very often", while 21% had five or more items reporting the impact.

According to OIDP SC, 211 respondents reported at least one impact to be "moderate" or "severe", giving prevalence of 70.2%, while the mean OIDP ADD was  $16.98 \pm 21.93$ .

The severity, prevalence and extent of OHIP-14 was significantly higher amongst elderly respondents above 60 years of age when compared with other age groups ( $p=0.005$ , 0.002, 0.027). Also, the mean OIDPADD was significantly higher in the elderly ( $>60$  years  $p=0.004$ ). However, the difference in OIDPSC was not significant when age group was considered.

The floor effects (proportion of participants without impact) of OHIP-14 and OIDP were 35.3% and 29.8%, respectively.

The mean VAS score for all participants was  $5.5 \pm 2.9$ . There was no significant relationship with mean VAS score according to gender and age ( $p=0.74$ ,  $p=0.48$  respectively).

The participants with pain from malignant lesions, vesiculobullous lesions and caries had the highest OHIP-14 prevalence, extent and severity scores, while the lowest were those in psychogenic and neurologic disease groups. (Table 1)

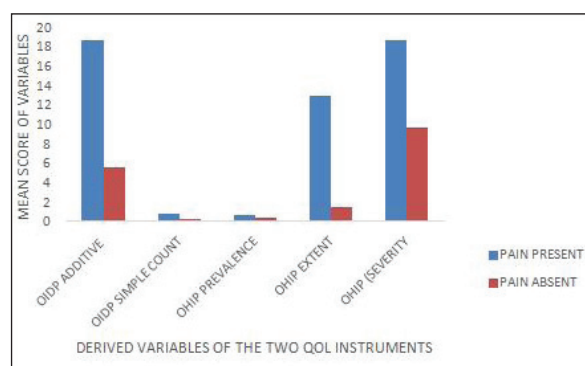
The same group of participants had the highest scores in both OIDP SC and OIDP ADD. These were malignant lesions, vesiculobullous lesions, TMJPDS and caries. However, there was a difference in the groups with the least mean OIDP SC and OIDP ADD. Psychogenic, benign lesions and periodontal lesions had the least mean OIDP SC, dentine hypersensitivity, odontogenic trauma, and stress-related lesions had the least mean OIDP ADD scores (Table 1).

Table 2 shows that items in the physical-related subscale (painful aching and eating difficulty) and psychological discomfort of OHIP-14 have the greatest impact on quality of life, while the OIDP item with the greatest impact were difficulty with eating, sleeping and cleaning.

For both OHIP-14 and OIDP, the severity, prevalence and extent of participants without pain were significantly lower than those with pain (OHIP-14:  $p=0.000$ , 0.008 and 0.007, OIDPSC

**Table 1.** Categories of OFP lesions and their OHIP and OIDP scores

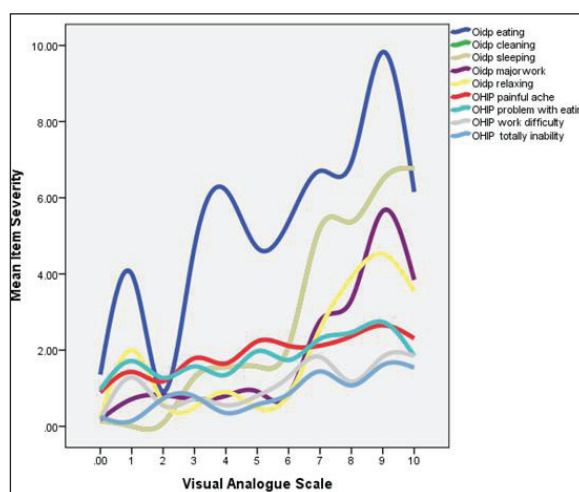
Category of orofacial pain lesions	OHIP scores			OIDP SCORES	
	Prevalence	Extent	Severity	OIDPSC (prevalence)	OIDPADD (severity)
Caries-related	0.66	2.2	16.8 ± 10.1	0.76	15.8 ± 18.7
Periodontal	0.63	2.8	15.4 ± 13.2	0.59	12.0 ± 17.2
Odontogenic trauma	0.52	0.8	8.1 ± 8.1	0.80	7.7 ± 9.7
Odontogenic infection	0.52	2.7	19.3 ± 11.8	0.74	24.8 ± 26.5
TMJ pain dysfunction	0.67	2.3	13.4 ± 10.8	0.89	14.6 ± 20.4
Neural lesions	0.48	3.6	19.9 ± 13.1	0.74	14.5 ± 17.3
Vesiculobulous	0.79	4.6	23.4 ± 16.8	0.70	28.6 ± 33.7
Benign neoplasm	0.70	1.3	15.8 ± 14.3	0.6	13.1 ± 12.5
Malignant neoplasm	1.0	9.0	37.7 ± 11.6	1.0	46.1 ± 31.0
Stress-related	0.67	5.7	28.0 ± 12.9	.67	13.1 ± 12.2
Psychogenic	0.50	2.0	10.0 ± 11.3	0.50	24.0 ± 33.9
Jaw fracture	0.5	3.0	19.0 ± 19.8	0.50	28.3 ± 22.1
MEAN	0.65	2.7	17.71 ± 12.6		



**Fig. 1.** A comparison of the mean scores of QOL variables with or without OFP.

and OIDPADD p=0.000, p=0.000, respectively) (Fig. 1).

OHIP items that showed the highest correlation with VAS were painful aching, difficulty doing usual jobs, being totally unable to function and difficulty with eating (r= 0.367, p=0.000 r= 0.364, p=0.000; r= 0.334, p= 000, and r= 0.332; p=0.000, respectively). Being embarrassed and being self



**Fig. 2.** Correlation between visual analogue scale (VAS) and OHIP severity.

conscious due to pain showed no significant correlation with VAS (r= 0.111, p=0.67; r=0.088, p=0.147, respectively).

There was also significantly positive correlation between visual analogue scale (VAS) and OHIP-14

**Table 2.** Prevalence & mean scores of OHIP-14 and OIDP items

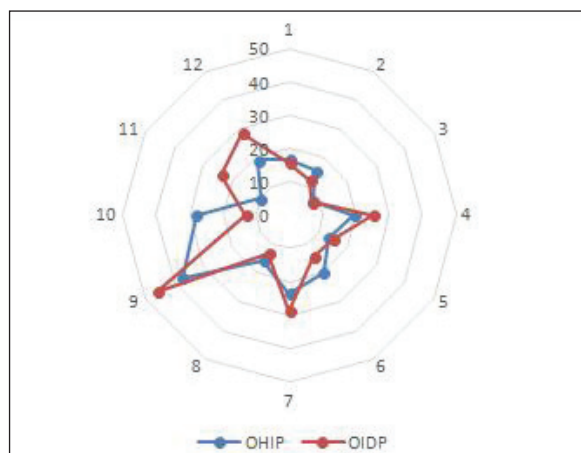
OHIP-14			OIDP		
OHIP subscale and items	Prevalence%	Mean item score	OIDP ITEMS	Prevalence%	Mean Item score
<b>Functional limitation</b>	11.7	0.12 ± 0.32	Eating	71.9	2.3 (1.9)
Difficulty pronouncing words	13.2	0.13 ± 0.34	Speaking	38.0	1.1 (1.8)
Bad taste	10.2	0.10 ± 0.31	Cleaning teeth	51.8	1.6 (1.9)
<b>Physical pain</b>	35.1	0.36 ± 0.48	Sleeping/relaxing	54.6	1.6 (1.8)
Painful ache in mouth	35.9	0.37 ± 0.48	Relaxing	47.1	1.2 (1.6)
Uncomfortable eating	34.2	0.36 ± 0.48	Showing teeth	35.2	1.0 (1.6)
<b>Psychological discomfort</b>	28.0	0.29 ± 0.45	Emotional status	44.4	1.2 (1.7)
Feeling self-conscious	32.5	0.34 ± 0.47	Carrying out work	41.4	1.2 (1.7)
Feeling tense	23.4	0.24 ± 0.43	Enjoy social contact	41.7	1.1 (1.7)
<b>Physical disability</b>	19.8	0.20 ± 0.40	Doing light physical activities	37.2	0.9 (1.5)
Unsatisfactory diet	20.3	0.21 ± 0.41	Total OIDP SC scores		
Interrupted meals	19.3	0.20 ± 0.40	Total OIDP ADD scores		
<b>Psychological disability</b>	15.6	0.16 ± 0.37			
Difficulty with relaxation	16.6	0.17 ± 0.38			
Embarrassment	14.6	0.15 ± 0.36			
<b>Social disability</b>	16.1	0.16 ± 0.37			
Irritable	16.9	0.17 ± 0.38			
Difficulty with routine work	15.3	0.15 ± 0.36			
<b>Handicap</b>	13.6	0.14 ± 0.35			
Dissatisfied with life	14.2	0.14 ± 0.36			
Totally unable to function	12.9	0.13 ± 0.34			

severity, prevalence and extent ( $r=0.354$ ,  $p=0.000$ ;  $r=0.241$ ,  $p=0.000$  and  $r=0.136$ ,  $p=0.023$ ,  $CI=-13.9$  to  $-11.1$ ). In addition, OIDPADD, OIDPSC had positive and significant correlation with VAS ( $r=0.431$ ,  $p=0.000$ ,  $r=0.444$ ,  $p=0.000$ ,  $CI -14.5$  to  $-9.3$ ) (Fig. 2).

Most items of OHIP-14 (except item 5 and 10) had low but significantly positive correlation with VAS. However, all items of OIDP had positive and significant correlation with VAS.

The correlation between extent and severity of OHIP was highly positive and very significant ( $r=0.867$ ,  $p=0.000$ ). So also the correlation between OIDP ADD and OIDP SC was positive and significant ( $r=0.457$ ,  $p=0.000$ ).

Inter-instrument correlation between OIDP ADD and OHIP severity also showed a positive and significant correlation ( $r=0.634$ ,  $p=0.000$ ) (Fig. 3).



**Fig. 3.** Comparison of severity of OHIP and OIDP.

### Reliability and validity of the two instruments

**Reliability:** Inter-item correlations of OHIP-14 and OIDP showed positive correlation between all items. Coefficients ranged from 0.32 (between item 1 and 5) to 0.79 (between item 7 and 10) for OIDP, and 0.23 (between item 2 and 5) to 0.73 (between item 7 and 8) for OHIP-14, and variations were not large enough for any item to be redundant. Correlation analysis of total item showed that all coefficients were above the minimum recommended (0.20) for inclusion in a scale, ranging from 0.56 (item 1) to 0.80 (item 9) for OHIP-14 and 0.55 (item 1) to 0.86 (item 9) for OIDP.

According to the correlation matrix, the standardized Cronbach alphas for OHIP-14 and OIDP were 0.93 and 0.94, respectively. Furthermore, alpha values were not increased by the removal of any item, rather, the values were decreased by item removal.

**Validity:** Concerning discriminant validity, the mean total OHIP-14 and OIDP scores were significantly lower in respondents without pain compared with those with pain. Also in view of construct validity, the study showed a significant correlation between VAS and OHIP & VAS and OIDP ( $r=0.354$ ,  $p=0.000$ ,  $r=0.431$ ,  $p=0.000$ , respectively).

### Discussions

This study showed no significant difference between gender and the prevalence of OHIP-14 and OIDP in keeping with similar studies<sup>7-9</sup> but in contrast to others<sup>10-12</sup> that have reported significant difference between these instruments and gender.

Mean QoL scores in elderly patients aged 60 and above were significantly higher in keeping with previous studies.<sup>13-15</sup> According to several other studies,<sup>13,16,17</sup> this finding has been attributed to edentulousness, TMJ disorders and other chronic diseases that make them less tolerant and uncomfortable with eating leading to more negative impact on quality of life. Other studies,<sup>10,18</sup> however, showed no significant difference in age group and quality of life with OFP.

The high prevalence of QoL item of OHIP and OIDP (64.5% and 70.2%, respectively) is in keeping with a similar African study in Tanzania<sup>19</sup> but contrasts with studies from western countries that included Norway,<sup>20</sup> UK,<sup>21</sup> and Australia<sup>22</sup> that had prevalence ranging from 11.3% to 22.3%. The high prevalence in this study may be related to the cohort of the study participants since the majority presented primarily with the complaint of OFP. The high percentage of people presenting with pain is in agreement with other previous studies<sup>5,23</sup> that have documented orofacial pain being the major reason for presentation at the dental clinics. Furthermore, dental clinic attendees at the study center pay out of their pockets as there is no effective health insurance scheme, and majority of the patients are low-income earners. Thus, patients only present at the advanced stage of diseases with associated pain. A Canadian study<sup>10</sup> had earlier observed that low income and lack of health insurance are factors contributing to high prevalence of oral impacts on QoL. This is a further argument for the need for inclusion of routine dental care and improvement in the health insurance scheme in national health policies.

The Cronbach alpha reliability index for OHIP and OIDP were 0.93 and 0.94, respectively which were far above the recommended threshold of 0.70. Some studies<sup>1,10</sup> have associated simplicity, good high internal consistency, very good face validity (which includes functional and psychosocial

activity), ease of content interpretation to higher reliability of OHIP. The higher prevalence and reliability score of OIDP in this study may be related to the predominant functional items of OIDP, which are the major reason for presentation in the study area as against the psychosocial items of OHIP-14.

The high face validity of both instruments in this study may be due to the interviewer approach in completing the questionnaire, which has been reported to give better validity<sup>24</sup> especially with OIDP where supposedly ambiguous questions were better explained to the participants by the interviewer.

A study<sup>1</sup> reported significant construct validity with correlation values ranging from  $r = 0.17-0.21$  while another study reported construct validity with confidence interval (CI) of 10.4 – 12.8 for OHIP and 6.7 – 10.5 for OIDP.

A remarkable observation in this study is the high Criterion validity for the two instruments as both instruments were able to distinguish between participants with pain from those without pain. These observations are in keeping with other studies<sup>1,10,25</sup> on orofacial pain that observed greatest impact on items of physical pain in OHIP-14, and eating, sleeping and cleaning as the greatest impact in OIDP.<sup>7,8,19</sup>

### **Disease group and instrument**

Previous study<sup>26</sup> at the study centre has established advanced stage presentation of oral cancer cases due more to patient delay because of initial unorthodox or quack consultations before presentation at orthodox health facility. Professional delay has also been associated with oral cancer cases in many underdeveloped countries due to inadequate cancer care equipment in tertiary health facilities. Several studies<sup>27,28</sup> have demonstrated that the negative impact of head and neck cancers on the quality of life is directly proportional to the stage of presentation. Although the OHIP and OIDP instruments are not specific for oral cancer QoL, both were able to detect the negative impact of this condition on quality of life.

As observed in this study and some other

studies,<sup>29,30</sup> impact on quality of life amongst patients with vesiculobullous lesion has been reported to be very high. These lesions include both immunological conditions such as lichen planus, erythema multiforme, lupus erythomatosus as well as infective conditions such as herpes zoster. All vesiculobullous lesions presented with painful secondary oral ulcers that have high negative impact on quality of life. However, some authors<sup>31,32</sup> have stated low or insignificant impact of oral mucosa lesions (that included vesiculobullous lesion) on QoL. Study cohort in some of these studies, however, either lack broad sample size or broad disease categories or healthy control for comparison.

Also the two instruments were effective in identifying the well-documented high negative impact of caries-related diseases in keeping with other studies.<sup>33,34</sup>

Previous literature reports on the impact of neurological lesion on QoL have observed the tendency for OHIP-14 to underestimate the impact of neurological lesion on QoL due to its diluting effect of psychosomatic component as against the items with ultimate impact in OIDP. This also was the observation in this study, but the lower value of OHIP-14 when compared with OIDP was not statistically significant for these conditions.

### **Conclusion**

The present study considered the two commonly used instruments of oral health-related QoL, and both exceeded the minimum value required for reliability. The items of the instruments were highly relevant and captured the usual complaints of patients with orofacial pain. Variations in scores were minimal and insignificant. Also the self-reported disease severity showed positive construct validity with both instrument and the discriminant validity was highly significant.

The authors, therefore, recommend the use of either instrument in measuring the impact of any orofacial pain condition on quality of life.

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