

# Does the Use of Corticobasal® Implant Treatment Improve the Patient's Quality of Life? A Cross-sectional Survey

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## ABSTRACT

**Aim:** To assess the improvement of the oral health-related quality of life in patients who received Corticobasal® implant-supported prostheses.

**Materials and methods:** A cross-sectional study design was conducted using a structured survey based on the validated oral health impact profile-14 (OHIP-14) questionnaire, with the addition of knowledge questions to fulfill the study requirements. All the patients who planned to receive Corticobasal® implant-supported prostheses (BCS®, Dr. Ihde Dental AG, 8737 Gommiswald, Switzerland) at Narsinhbhai Patel Dental College and Hospital were asked to participate in the study after screening for the inclusion and exclusion criteria. The questionnaire was distributed and filled out before and six months after treatment for section C. Data were analyzed using SPSS 17.0 version. A paired *t*-test was used to analyze the average of all the OHIP-14 items (pretreatment vs posttreatment), while gender differences in total OHIP scores were analyzed using an independent-samples *t*-test. A *p*-value of < 0.05 was considered statistically significant. Descriptive statistics were presented in terms of tables and graphs.

**Results:** A total of 82 patients (68.3% females, 31.7% males) participated in the study. A significant improvement was reported with the use of the Corticobasal® implant treatment (*p* = 0.0001), with no gender variation (*p* = 0.1341). Seventy-eight participants (95%) were very satisfied with the treatment's time, while 97.5% showed their interest in recommending the treatment modality. The majority of the participants knew about the treatment modality from social media. The participants reported high satisfaction with the treatment and overall outcomes.

**Conclusion:** Corticobasal® implant treatment modality significantly improves the patient's quality of life with a reported enhancement in the patients' functional abilities and psychosocial well-being and reduced functional limitation.

**Clinical significance:** Corticobasal® implant treatment is a reliable treatment option for rehabilitation patients presented with compromised bone support, with reported improvement in patient quality of life.

**Keywords:** Corticobasal® implants, Dental implants, Oral health impact profile, Oral rehabilitation, Patient satisfaction, Quality of life.

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## INTRODUCTION

Edentulism remains a major public health issue, significantly affecting an individual's esthetics, function, social interaction, and quality of life.<sup>1-5</sup> The rehabilitation of edentulous patients has traditionally been addressed through removable dentures or conventional endosseous implants.<sup>1</sup> However, patients with severe alveolar bone resorption often require complex treatment modalities, including bone grafting or sinus lifting to facilitate implant placement, increasing the cost, duration, and risk of treatment.<sup>6,7</sup>

Corticobasal® implantology has emerged as an alternative treatment modality that can overcome these limitations with a high reported success rate.<sup>6-9</sup> Corticobasal® implants are specifically designed to engage the strongest cortical bone, which remains relatively stable even in cases of advanced bone atrophy.<sup>6-9</sup> It provides immediate load-bearing capabilities, eliminates the need for bone grafting, shortens the rehabilitation period significantly, and qualifies to rehabilitate patients with maxillofacial defects.<sup>1,6-18</sup> The smooth surface design of the implant reduces the risk of plaque or calculus adhesion, which significantly improves the peri-implant soft tissue health. Awadalkreem et al.<sup>7</sup> reported a 100% survival rate after 18 months of using immediately loaded Corticobasal® implant-supported prostheses in compromised ridge support patients with reported improvement in the patients' overall satisfaction, comfort, esthetics, phonetics, and mastication. Moreover, Pařka and Lazarov<sup>11</sup> documented a cumulative survival of 99.3%, 98.6%, and

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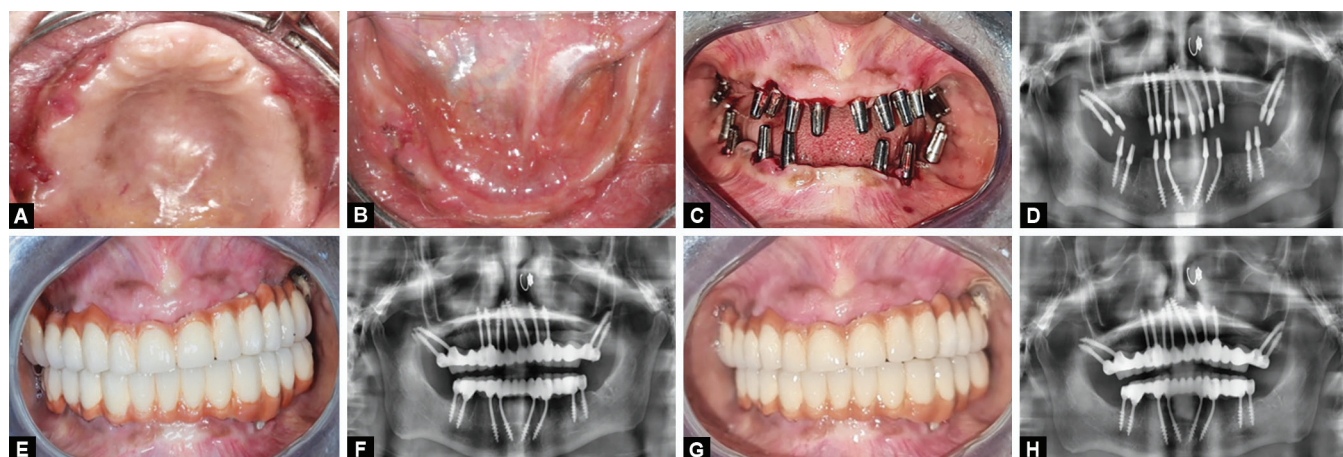
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97.0%, respectively, at 12, 24, and 35 months following Corticobasal® implant treatment, while Patel et al.<sup>14</sup> reported a 97.5% 1-year survival rate. A recent review article highlighted the successful use



**Figs 1A to H:** The clinical and radiographic presentation of the patient code 002. (A) Intraoral view of the patient showing maxillary edentulous arch; (B) Intraoral view of the patient showing mandibular edentulous arch; (C) Intraoral view of the maxillary and mandibular jaws presenting implant distribution; (D) The postimplant insertion panoramic radiograph showing the maxillary and the mandibular implant distribution; (E) The intraoral view presenting the maxillary mandibular fixed Corticobasal® implant-supported prostheses; (F) The postimplant insertion panoramic radiograph showing the maxillary and the mandibular implant-supported prostheses; (G) The 12 months follow-up intraoral view. (H) The 12-month follow-up panoramic radiographs

of basal implants as a treatment modality of severely resorbed ridge cases, with success and survival rates ranging from 90.3 to 100% for intraoral basal implants and 88.2% and 92.9% for orbital and nasal implants, respectively.<sup>8</sup>

Despite the fact that clinical outcomes such as implant survival rates are important, understanding the impact of treatment on the patient's quality of life and perceived satisfaction is equally critical. Patient-reported outcome measures (PROMs) provide valuable insights into how treatments affect daily living, psychological well-being, and social functioning.<sup>19–23</sup> Several validated questionnaires have been developed to measure the dental treatment outcomes, including the geriatric oral health and assessment index (GOHAI) (1), dental impact profile, oral health impact profile (OHIP), craniofacial pain and disability inventory, and dentin hypersensitivity experience questionnaire.<sup>13,24–28</sup> However, there is limited data concerning their use with Corticobasal® implant treatment. This study aims to assess the improvement of patient quality of life following Corticobasal® implant treatment using the oral health-impact profile quality of life index and to explore if gender variation exists. Moreover, the study investigated the patients' knowledge about Corticobasal® implant treatment.

## MATERIALS AND METHODS

### Patient Selection and Informed Consent

A cross-sectional study design was carried out at Narsinhbhai Patel Dental College and Hospital, Visnagar, between 2021 and 2023. The study protocol was approved by the Ethics Committee of Narsinhbhai Patel Dental College and Hospital, Visnagar, with IEC Number NPDCH/IEC/2021/45, before the commencement of the study. A signed informed consent was collected from each participant before enrollment.

### The Study Sample

A convenient sample size, including all the patients who planned to receive Corticobasal® implant-supported prostheses (BCS®, Dr. Ihde Dental AG, 8737 Gommiswald, Switzerland) at Narsinhbhai Patel

Dental College and Hospital during the study duration between 2021 and 2023, was asked to participate in the study after screening for the inclusion and exclusion criteria.

### Inclusion and Exclusion Criteria

The inclusion criteria included patients with partial or full edentulism in the upper jaw or both the upper and lower jaws whose treatment plan involved rehabilitation with Corticobasal® implant-supported prostheses, aged 18 years or above. Patient's willingness to participate in the study after a full description of the study protocol and signing the informed consent form.

Patients with a history of psychiatric illness or cognitive impairment and incomplete treatment or failure to follow-up were excluded from the study.

### Surgical and Prosthetic Procedure

All the patients were treated by the same maxillofacial surgeon and prosthodontist and followed the same surgical and prosthetic standard protocol (Fig. 1).

### Questionnaire Design

Direct interviews were conducted using a questionnaire composed of 3 sections: Section A: Demographic data. Section B: Specific questions evaluating the patients' knowledge and recommendation regarding the Corticobasal® implant, and the treatment's time satisfaction. Section C: Includes patient-reported outcomes, based on the validated OHIP-14 questionnaire with slight modifications to fulfill the study requirements.

### Study Measurements

The OHIP-14 includes seven domains related to functional limitations, physical pain, psychological discomfort, and physical, psychological, and social disabilities. Each domain consists of two questions scored using a Likert scale (0 = Never to 4 = Very often, or similar categorical responses for satisfaction). Domain scores were obtained by summing the answers to the two corresponding questions.

The questionnaire was distributed and filled out before and six months after treatment for section C (The OHIP-14 section). The obtained data from before and after treatment were statistically analyzed using the appropriate statistical method.

### Data Analysis

Analysis of the data was achieved using the Statistical Package for Social Sciences software (SPSS®, version 17, IBM, Chicago, IL, USA). Means and standard deviations (SDs) as well as percentages were used for descriptive data. A paired *t*-test was used to analyze the average of all the OHIP-14 items (pretreatment vs posttreatment), while gender differences in total OHIP scores were analyzed using an independent-samples *t*-test. A *p*-value of < 0.05 was considered statistically significant (Fig. 2).

### Reliability and Validity of the Questionnaire

A pilot study was conducted to assess the validity and reliability of the questionnaire using Cronbach's Alpha test. The questionnaire was administered to a cohort of 10 patients twice, with a period of 2 weeks' interval, revealing a result of Cronbach's alpha of 0.86. The validity of the questionnaire, the consistency, and the time needed for answering were tested using a panel of experts and the same cohort of patients who highlighted the clarity, relevancy, and hence the validity of the questionnaire.

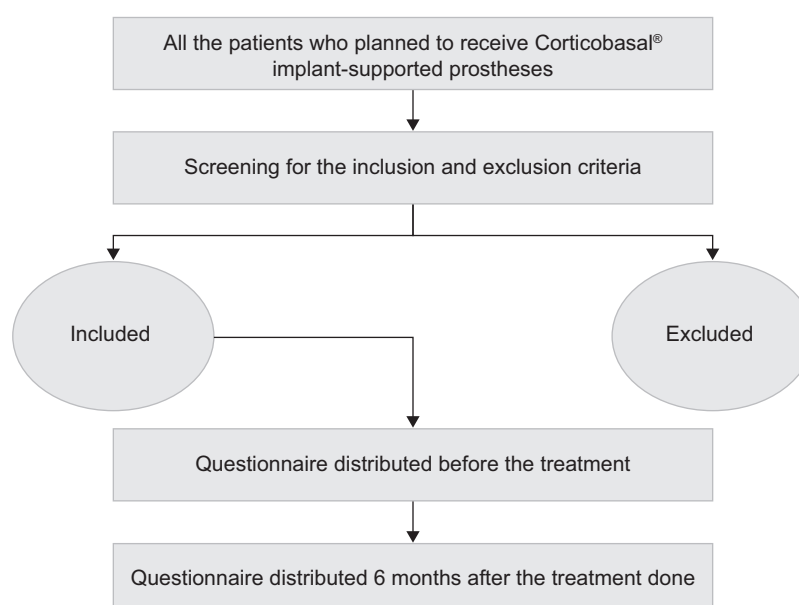
## RESULTS

### Participants' Characteristics

A total of 82 patients were enrolled in the study, comprising 56 females (68.3%) and 26 males (31.7%), with 29.3% (24 participants) having a past medical history, 14.6% (12) having clenching, and 7.3% (6) having bruxism (Table 1). Sixty-six participants (80.5%) used a toothbrush to maintain their oral hygiene health, and 10 (12.2%) had a smoking habit, while 2 (2.4%) were snufflers. The majority of the patients replaced both maxilla and mandible and were replacing all their teeth (46.3%, 38; 48.8%, 40, respectively) (Table 1).

**Table 1:** Participants' characteristics, including patients' gender, past medical history, habits, oral hygiene habits, social habits, jaw to be restored, and the number of missing teeth

| Variable                | Number | %    |
|-------------------------|--------|------|
| Participant's gender    |        |      |
| Male                    | 26     | 32.5 |
| Female                  | 56     | 68.3 |
| Past medical history    |        |      |
| Yes                     | 24     | 29.3 |
| No                      | 58     | 70.7 |
| Habits                  |        |      |
| Clenching               | 12     | 14.6 |
| Bruxism                 | 6      | 7.3  |
| Not applicable          | 64     | 78.0 |
| Oral hygiene habits     |        |      |
| Toothbrush              | 66     | 80.5 |
| Miswak                  | 8      | 9.8  |
| No                      | 8      | 9.8  |
| Social habits           |        |      |
| Smoking                 | 10     | 12.2 |
| Snuffing                | 2      | 2.4  |
| Not applicable          | 70     | 85.4 |
| Jaw to be restored      |        |      |
| Maxilla                 | 24     | 29.3 |
| Mandible                | 20     | 24.4 |
| Both                    | 38     | 46.3 |
| Number of missing teeth |        |      |
| 1–<4                    | 16     | 19.5 |
| 4–6                     | 26     | 31.7 |
| All teeth are missing   | 40     | 48.8 |



**Fig. 2:** Flowchart diagram of the study design

### Participants' Knowledge of Corticobasal® Implants

When asking from where the patients know about Corticobasal® implants, 90% (72) had heard about implant treatments from social media, 2.5% had heard about implant treatments from friends or read about it in a book, 1.25% had been referred to the implant department by other dentists or from television, and 5% had read about implant treatments in newspapers (Fig. 3).

### Participants' Recommendations about the Corticobasal® Implants Treatment

Regarding whether the participants would recommend Corticobasal® Implants treatment, the majority of the participants answered that they will do (97.5%, 80 subjects), while two participants (2.5%) were probably they will (Fig. 4).

### Participants' Satisfaction with the Overall Time It Took to Complete the Treatment

Considering the participants' satisfaction with the overall time it took to complete the treatment, the majority of the participants were very satisfied (95%, 78 subjects), 2 participants (2.5%) were satisfied, while only one participant was dissatisfied, and the same was very dissatisfied (Fig. 5).

### Participants' Quality of Life before and after the Corticobasal® Implant Treatment

The evaluation of the OHIP scores showed a significant improvement in patients' quality of life after Corticobasal® implant treatment ( $p < 0.0000001$ , mean before  $(3.59 \pm 0.49)$  and mean after  $(0.54 \pm 0.27)$ ). The reported functional limitations were reduced significantly ( $p < 0.001$ ) from  $(3.70 \pm 0.45)$  to  $(0.34 \pm 0.21)$ .

Physical pain had significantly ( $p < 0.001$ ) decreased from  $(2.96 \pm 0.52)$  to  $(0.96 \pm 0.33)$  after treatment. While the psychological discomfort, physical disability, social disability, and handicap reduced from  $(3.43 \pm 0.48)$ ,  $(3.62 \pm 0.50)$ ,  $(3.64 \pm 0.49)$ ,  $(3.74 \pm 0.46)$ , and  $(3.73 \pm 0.51)$  to  $(0.76 \pm 0.30)$ ,  $(0.46 \pm 0.26)$ ,  $(0.61 \pm 0.29)$ ,  $(0.28 \pm 0.22)$ , and  $(0.40 \pm 0.25)$ , respectively, with significant report ( $p < 0.001$  for all) (Table 2; Fig. 6).

No statistically significant difference ( $p = 0.1341$ ) was reported in the OHIP scores between the different genders using an independent-samples *t*-test. Despite that, males had a slightly higher mean total OHIP score compared to females (4.95 and 4.86, respectively) (Table 3).

## Discussion

Oral rehabilitation using immediately loaded Corticobasal® implant-supported prostheses is a significant advancement in implant dentistry. Studies have reported a high success rate of Corticobasal® implants: 97.5%, 96.8%, and 100%.<sup>7,14,15</sup> A result that matches conventional endosseous implant treatment with a reported survival rate of 90–99.4% for immediately loaded immediate loading flapless implant placement technique during 1–10 years of follow-up, with the advantages of avoiding the bone grafting procedure and its probable adverse effects.<sup>29</sup>

This study aimed to assess the impact of Corticobasal® implant-supported rehabilitation on patient satisfaction and oral health-related quality of life (OHRQoL). The novelty of the study highlighted the use of an innovative oral implant system that not only eliminates the need for bone grafting in cases with compromised ridge support but also promotes successful treatment

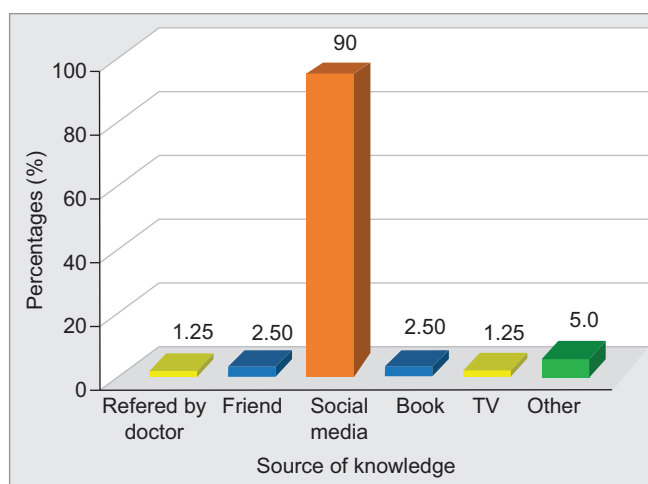


Fig. 3: Participants' response regarding knowledge about Corticobasal® implant treatment

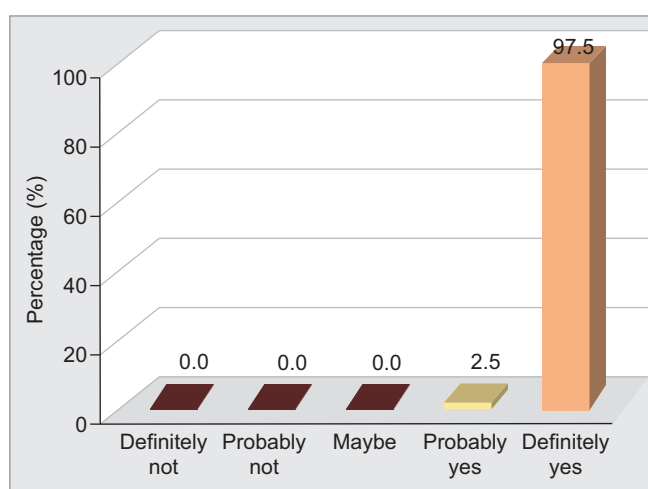


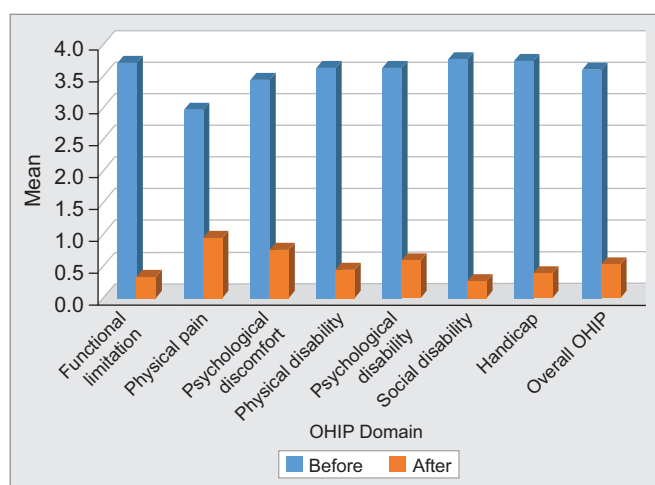
Fig. 4: Participants' responses regarding whether they recommend the treatment to others



Fig. 5: Participants' responses about being satisfied with the overall time it took to complete the treatment

**Table 2:** Participants' quality of life using the different OHIP domains

| OHIP domain              | Before |      | After |      | p-value             |
|--------------------------|--------|------|-------|------|---------------------|
|                          | Mean   | SD   | Mean  | SD   |                     |
| Functional limitation    | 3.7    | 0.45 | 0.34  | 0.21 | <0.001              |
| Physical pain            | 2.96   | 0.52 | 0.96  | 0.33 | <0.001              |
| Psychological discomfort | 3.43   | 0.48 | 0.76  | 0.3  | <0.001              |
| Physical disability      | 3.62   | 0.5  | 0.46  | 0.26 | <0.001              |
| Psychological disability | 3.64   | 0.49 | 0.61  | 0.29 | <0.001              |
| Social disability        | 3.74   | 0.46 | 0.28  | 0.22 | <0.001              |
| Handicap                 | 3.73   | 0.51 | 0.4   | 0.25 | <0.001              |
| Overall OHIP             | 3.59   | 0.49 | 0.54  | 0.27 | <0.0000001 (approx) |

**Fig. 6:** Showing the participants' quality of life using the different OHIP domains**Table 3:** The association between the participants' gender and the improvement in their quality of life using OHIP-14

| Participant's gender | Before |      | After |      | p-value |
|----------------------|--------|------|-------|------|---------|
|                      | Mean   | SD   | Mean  | SD   |         |
| Male                 | 1.19   | 0.49 | 4.95  | 0.13 | 0.1341  |
| Female               | 1.18   | 0.53 | 4.86  | 0.40 |         |

An independent t-sample test was used

outcomes, addressing a significant improvement in the patient's oral health status.

The use of OHIP-14 has been recommended as one of the most commonly used OHRQoL indicators globally. A recommendation that is in line with many investigations and emphasized by Fernandes et al.<sup>25</sup> and Alzarea.<sup>25,26,28,30</sup>

The high reported overall implant satisfaction in this study matches the previous literature on Corticobasal® implant documented by: Lazarov,<sup>13</sup> Patel et al.,<sup>14</sup> Awadalkreem et al.,<sup>1,7,9</sup> and Sahoo et al.<sup>27</sup> who highlighted a significant improvement in patients' function, esthetics, and satisfaction following the treatment with Immediately Loaded Corticobasal®

implant-supported prostheses. Lazarov<sup>13</sup> reported a significant improvement in the patient's oral health following Corticobasal® implant treatment, irrespective of the patient's periodontal status, smoking. Moreover, the result of the present study is in accordance with the satisfaction level documented by the different endosseous conventional implants, including: Fillion et al.,<sup>24</sup> Filius et al.,<sup>30</sup> Petricevic et al.,<sup>31</sup> Patel et al.,<sup>32</sup> Erkapers et al.,<sup>33</sup> and Trindade et al.<sup>34</sup> Fillion et al.<sup>24</sup> reported a significant improvement in the patient's oral health-related quality of life following implant treatment. Filius et al.<sup>30</sup> documented an increase in patient satisfaction in esthetics, chewing, and speech following fixed implant prostheses with no reported effect on the general health of the patients. Petricevic et al.<sup>31</sup> found a significant improvement in the patient's oral health-related quality of life following the use of posterior implant- and teeth-supported prostheses, with a significant improvement of implant-fixed prostheses in older patients. Moreover, Patel et al.<sup>32</sup> highlighted the positive effect of implant treatment on the patient's oral health and quality of life. Furthermore, Erkapers et al.<sup>33</sup> reported the highest improvement in the oral health quality of life among the edentulous maxillary patients at the 12-month follow-up visit following implant insertion, while Trindade et al.<sup>34</sup> found that changing from complete denture to implant-supported prostheses improves the patients' masticatory performance.

The results of the present study demonstrated a marked reduction in functional limitations, physical pain, psychological discomfort, and social disabilities following treatment. The same result had been highlighted by Lazarov<sup>13</sup> who reported a positive change in the patients' psychological state, a 96% significant pain reduction, and 89% significant chewing ability improvement. In the same line, Sahoo et al.<sup>27</sup> documented significant improvements in patient quality of life following the Corticobasal® implant with observed differences in pain, infections, and/or swelling, sleeping disturbances, reduction in self-confidence, taste, chewing discomfort, and influence on food choice before and after the Corticobasal® implant treatment. On the other hand, Alzarea<sup>26</sup> reported a significant improvement following conventional implant treatment using the same OHIP-14 indicator.

Considering the gender variation, no statistically significant differences were found between males and females regarding total OHIP scores. This is consistent with previous implant research, where gender has not consistently emerged as a determinant of patient-reported success or satisfaction, and is in line with Sargolzaie et al.<sup>35</sup> who reported a significant improvement in

the patient's quality of life following implant treatment with no association with the patient's gender, education, and place of residence. In the same line, Rutkowski et al.<sup>36</sup> documented a high patient satisfaction level in patients treated with a Zirconium implant without gender variations. On the other hand, Fedik and Diab<sup>37</sup> highlighted the significant role of gender in higher awareness about the oral health status and care among females. This can be attributed to adherence of the female to more protective care and their greater health-seeking behavior, a result that is in line with Rajeh et al.<sup>38</sup>

Regarding the knowledge about Corticobasal® implant treatment, the result of the study highlighted the role of social media in improving patient awareness about Corticobasal® implant treatment. A result that is in agreement with Awadalkreem et al.,<sup>1</sup> who reported that dentists are the main source of information about basal implants, followed by friends and online media. However, this variation can be related to the differences in study areas between the two studies.

The majority of the participants reported that they would recommend implant treatment, a result that matched Awad et al.,<sup>39</sup> Pjetursson et al.,<sup>40</sup> Berretin-Felix et al.,<sup>41</sup> and Awadalkreem et al.,<sup>1,7,9</sup> and Alzarea BK.<sup>26</sup>

The success in dental implant treatment extended beyond the clinical, biological, and prosthetic parameters. Patient-reported outcomes, particularly those reflecting reduced physical pain and functional limitations, improving speech, mastication, and overall comfort with decreased psychological discomfort, minimizing disability, and enhancing patients' confidence and self-image, are considered critical indicators of treatment effectiveness, prioritizing patient experience and satisfaction.

The strengths of this study include the use of a validated questionnaire, OHIP-14 supplemented with specific Corticobasal® implant-related questions, and the inclusion of a significant cohort of patients. However, the limitation of the study, including the one-center study design, is that the data were collected from one study area, which may restrict the generalization of the results and highlights the need for a large multicenter study for more global results.

Future scope of research suggested the conduction of a longitudinal study design to investigate the improvement of the patient's oral health over time.

## CONCLUSION

Corticobasal® implant therapy significantly improves the patient's quality of life with a reported enhancement in the patients' functional abilities, psychosocial well-being, and reduced functional limitation. Hence, it represents a reliable treatment option for rehabilitation patients with compromised bone support, offering excellent results across diverse patient groups without significant gender-based variations.

Based on the outcomes of this study, the clinician can anticipate using Corticobasal® implant therapy not only to replace missing teeth but also to enhance the patient's quality of life by improving the patient's masticatory efficiency, psychological well-being, and social interaction.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Research Involving Human Participants and/or Animals

All procedures performed on the patients involved were in accordance with the ethical standards of the institutional and/or national research committee, as well as the 1964 Helsinki Declaration, its later amendments, and comparable ethical standards.

## Ethical Approval

The study protocol was approved by the Ethics Committee of the Narsinhbhai Patel Dental College and Hospital, Visnagar IEC number: NPDC/IEC/2021/45 prior to the commencement of the study.

## Informed Consent

Informed consent was obtained from all the individual participants in this study before enrollment.

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