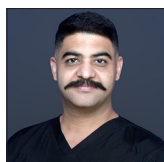


Review Article

Bioethical imperatives in periodontics - A narrative review of challenges and practices within the Indian healthcare environment

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ABSTRACT

Periodontics, which is that discipline of dentistry dealing with the prevention and treatment of conditions related to the tooth-supporting structures, functions within a sophisticated ethical environment. Within the Indian context, this is substantially amplified by enormous socioeconomic inequalities, cultural diversity, poor health literacy, and the growing commercialization of healthcare. This review rigorously examines the use and abuse of the four universal bioethical principles – Autonomy, Beneficence, Non-Maleficence, and Justice – by modern Indian periodontology. Major challenges discussed are that of obtaining truly informed consent in the face of language and educational disadvantage, the moral conflict of overtreatment for profit, the inequitable allocation of specialist care (Distributive Justice), and the honesty of clinical trials and education. Through a reading of the current literature, professional codes (Dental Council of India and Indian Dental Association), and law precedents, this article suggests a context-specific ethical decision-making framework and offers practical recommendations. Ultimately, the review highlights the urgent need for a reemphasis on standardized bioethics training and enhanced professional responsibility to safeguard patient welfare and social trust in Indian periodontics.

Keywords: Bioethics, Evidence-based dentistry, Universal bioethical principles

INTRODUCTION

Bioethics is a field that analyzes the ethical and moral issues of biological research and medical interventions. In the field of dentistry, and of periodontics in specific, ethical issues are naturally embedded in everyday clinical choices. Periodontal therapy varies from basic scaling and root planing to intricate surgery, guided tissue regeneration (GTR), and the placing of dental implants. The treatments tend to be invasive, expensive, and need the long-term cooperation and engagement of the patients, and thus, the ethical stakes are elevated considerably.^[1] The Indian health system is typified by an excess of private practitioners, emergent corporate dental chains, and underresourced public health system. India's staggering cultural, linguistic, and socioeconomic diversity poses a distinctive set of challenges to the universal application of bioethical principles.^[2] The co-existence of specialized upscale urban clinics and little or no care in expansive rural regions poses an inherent ethical dilemma, mainly focused on Justice. In addition, the shift from essentially paternalistic doctor-to-patient relations to patient-focused, independent models is entangled by prevalent social structures of hierarchy and differing patient educational levels.^[3]

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This review seeks to:

1. Examine the four major principles of bioethics within clinical periodontics in India
2. Elaborate on the precise ethical issues posed by the distinct Indian sociopolitical and economic context
3. Recommend a systematic framework for periodontal practice ethics decision-making.

MATERIALS AND METHODS

This narrative review utilized electronic database searches across PubMed, Scopus, and Google Scholar from January 2012 to August 2025, using combinations of keywords: “periodontics,” “bioethics,” “informed consent,” “overtreatment,” and “India.” Inclusion criteria encompassed English-language peer-reviewed articles and major Indian dental codes. Studies were critically appraised for relevance to clinical bioethics, commercialization, and patient autonomy. Literature synthesis prioritized well-documented dilemmas in real-world clinical settings. As primary data is limited, a narrative review methodology is justified to contextualize Indian-specific issues.

Periodontal practice is conventionally informed by the four-principle method: Autonomy, Beneficence, Non-Maleficence, and Justice.^[4] Autonomy advocates the patient’s right to make voluntary, informed decisions on his own medical treatment. In periodontics, this is institutionalized in the process of informed consent (IC). A valid IC entails full disclosure, understanding, voluntariness, and competence.^[5] India’s poor average health literacy and language diversity (more than 22 official languages) represent a significant challenge to realizing genuine understanding. Consent forms are usually written in standardized English, a language not available to most patients, especially those attending teaching hospitals or peri-urban clinics.^[6] The moral obligation is that subtle jargon used for periodontal prognosis, surgical complications (e.g., nerve paresthesia, recurrence of bone loss), and other alternatives is precisely explained in the patient’s language, frequently by having to use visual aids, demonstrations, and simple, straightforward descriptions.^[7]

In many Indian sociocultural settings, healthcare decisions, especially those involving significant financial outlay or surgical intervention, are made by the family unit (patriarch/spouse) rather than the individual patient.^[8] Although the law acknowledges the individual patient’s will (if competent and 18 years or older), the periodontist is confronted with an ethical dilemma between honoring the patient’s legal autonomy and honoring the predominant cultural expectation of family decision-making. The professional must exercise great care in determining whether the patient’s individual will is truly being exercised.

Beneficence requires that the periodontist act in the interests of the patient’s health, and Non-Maleficence forbids harm to

be done. These are challenged by the commercial realities of private practice. An everyday periodontal ethical challenge is whether to preserve a tooth with a guarded or poor prognosis or to extract and replace with a prosthetic solution, such as an implant. Beneficence prefers preservation where feasible. Yet, prescribing lengthy, costly, and prolonged treatments (e.g., complicated regenerative therapy) for a tooth that has a high rate of failure can transgress Non-Maleficence by inflicting financial damage and avoidable suffering.^[9] Ethical treatment planning requires presenting the most likely, cost-saving option first, explaining clearly the prognosis for each alternative.

With the expansion of corporate dental chains and increased competition in major Indian cities, there has been greater emphasis on efficiency and business sustainability within dental practices. While corporatization offers advantages such as standardized protocols and broader access to care, concerns have emerged regarding the potential for financial considerations to influence clinical decision-making. Overtreatment – offering unnecessary procedures (e.g., placement of an implant immediately when conditions are poor or full-mouth rehabilitation when localized treatment is adequate) – is a clear transgression of Non-Maleficence and the periodontist’s fiduciary obligation.^[10] The Dental Council of India (DCI) Code of Ethics categorically forbids commercial exploitation and requires the patient’s welfare to be preserved to the maximum, thus ensuring that the patient’s interests remain central in all treatment decisions.^[11]

Justice, in this case, distributive justice, deals with the equitable sharing of scarce resources and healthcare benefits and burdens within society. India is plagued by a very high urban-rural imbalance in the deployment of dental professionals. Too few periodontists serve the large rural majority, and this creates a pattern in which sophisticated periodontal treatment (e.g., laser therapy, complex implantology) is largely relegated to urban, wealthier areas.^[12] Such systemic injustice represents a serious affront to distributive justice. Ethical imperative calls upon periodontists to become involved in public health efforts, practice tele-dentistry, and advocate for incorporating basic periodontal screening within primary healthcare. If patients are unable to pay for the ideal recommended treatment (e.g., guided bone regeneration), the periodontist has a moral duty to provide the “next best” cost-effective alternative that also represents the minimum standard of care.^[13] Refusal to treat or providing only the most expensive option is an ethical lapse in justice.

Clinical studies are needed to move periodontics forward (e.g., trying new bone graft substitutes or laser techniques). In India, human research needs to follow the strict rules of the Indian Council of Medical Research.^[14]

Vulnerability and exploitation: The low socio-economic status

Table 1: Contextualized ethical decision-making framework for Indian periodontics.

Step	Action required (The Indian context)	Ethical principle (s) in focus
1. Clinical assessment	Determine all clinically feasible treatment options and their prognoses (Ideal, Acceptable, Minimal/Cost-Effective).	Beneficence, Non-Maleficence
2. Contextual assessment	Assess patient's literacy, preferred language, socioeconomic status, and cultural beliefs (e.g., aversion to grafts, family dynamics). Document who is the decision-maker.	Justice, Autonomy, Cultural competence
3. Informed disclosure	Disclose all options, risks, benefits, alternatives, costs, and consequences of no treatment. Use simple, vernacular language (Verbal and Written informed consent). Crucially: Address potential for overtreatment.	Autonomy (Disclosure), Non-maleficence
4. Voluntariness and consent	Secure the patient's individual consent (if competent). If family pressure is evident, reinforce the patient's individual right to choose while maintaining respect for the family's input.	Autonomy (Voluntariness)
5. Ethical treatment execution	Select the treatment that aligns with the patient's informed choice and available resources, ensuring quality is not compromised for cost. If a student performs the procedure, confirm patient is informed.	Beneficence, Justice, Non-maleficence
6. Documentation and review	Thoroughly document the entire consent process (language used, questions asked, and patient's comprehension). Review the outcome against the expected ethical standard.	Professional accountability

Table 2: Case scenario illustrating the ethical framework in practical context with a real-world patient centered on Indian sociocultural realities and resource constraints.

Step	Case scenario example	Ethical considerations
1. Clinical assessment	Mr. Sanjay, a 56-year-old farmer with severe periodontitis, presents with mobile teeth, abscesses, and halitosis. Treatment options include full-mouth surgery with implants or staged conservative therapy.	Beneficence: Provide treatments maximizing patient benefit. Non-Maleficence: Avoid unnecessary harm or overtreatment.
2. Contextual assessment	Mr. Sanjay has low literacy, speaks only Marathi, and family is involved in decision-making. Income limited, so affordability is a major factor.	Justice: Fair consideration of socioeconomic limitations. Autonomy: Respect for patient's and family's cultural dynamics.
3. Informed disclosure	Treatment options explained in Marathi with pictures, highlighting costs, benefits, risks, and prognosis. Family requests quick solution; dentist emphasizes ethical considerations and patient's welfare.	Autonomy: Clear, understandable information for informed decisions. Beneficence: Promoting best interests over financial incentives.
4. Voluntariness and consent	Patient and family engage in discussion; consent form signed by Mr. Sanjay is witnessed, confirming voluntary and informed agreement.	Autonomy: Ensuring voluntary consent. Justice: Respecting cultural norms and family involvement.
5. Ethical treatment execution	Chosen treatment is staged root planing and partial denture, with full supervision. No overtreatment or cost-cutting, transparent about trainee involvement.	Beneficence, Non-Maleficence: Quality care without exploitation. Justice: Equitable care regardless of cost constraints.
6. Documentation and review	All communications, decisions, and consent details are documented. Follow-up reviews monitor outcomes and ethical soundness.	Accountability: Full documentation for professional and ethical standards. Justice: Ongoing evaluation to ensure fair care delivery.

and illiteracy of potential participants in certain Indian contexts make them vulnerable to exploitation. Ethical review boards (Institutional Review Boards/Independent Ethics Committees) need to ensure that the potential for undue inducement (e.g., overpayment) does not undermine the voluntariness of the consent.

Post-trial access: There is an ethical responsibility on the part of researchers to see that the participants, particularly those from

underprivileged communities who are benefiting from the trial intervention, do not lose access to that intervention after the trial.

Teaching hospitals form the backbone of periodontal training. *Rights of patients versus training requirements:* Ethical dilemma exists when an intricate procedure (e.g., complicated GTR) is handed over to a trainee (postgraduate student). Patients are entitled to be completely informed that a student, under supervision, will be carrying out the procedure.^[15]

Supervision and competence: Making certain that the treatment quality delivered by a trainee is on par with that delivered by a specialist maintains Beneficence. Inadequate faculty supervision based on administrative or volume concerns is a systemic ethical failure.

The DCI Code of Ethics in the past had severe restrictions on professional advertising to uphold the dignity of the profession. With growing liberalization and judicial interpretations, such restrictions have eased, resulting in a Gray area.^[16]

Misleading claims: Ads that promise outcomes (e.g., Implants in 30 min Guaranteed Success) or unsubstantiated claims of superiority transgress both the DCI code and the ethic of Non-Maleficence (by inducing false hope) and Autonomy (by presenting false information for decision-making).

Discount dentistry: Although intended to enhance access, advertisement of offers can coerce practitioners into sacrificing material or time, in turn, breaching the standard of care and Beneficence.^[10]

Artificial intelligence (AI) is rapidly transforming periodontics by enhancing diagnostic precision, treatment planning, and patient outcomes. AI-powered technologies analyze clinical and radiographic data, standardizing assessments that conventionally suffer from subjectivity and practitioner variability.^[17,18]

Diagnostic advances: AI models leveraged in periodontics include convolutional neural networks that analyze digital radiographs, cone beam computed tomography scans, and intraoral photographs to detect periodontal bone loss, pocket depths, and early disease markers with high accuracy and sensitivity.

Treatment planning and surgical guidance: AI assists clinicians in devising personalized treatment strategies by predicting disease progression risk based on patient demographics, genetics, and clinical features. AI tools can simulate implant placements and guide minimally invasive surgeries, improving precision and reducing complications.

Examples of AI software in periodontics

Dynasmile video-based smile analysis software: Enhances esthetic assessments through dynamic smile pattern analysis.

VideaHealth AI dental diagnostics: Provides deep learning-powered automated bone loss detection and periodontal prognosis from radiographs.

Pearl AI and Overjet AI: Offer Food and Drug Administration-cleared automated assessments of dental radiographs to quantify bone loss and support longitudinal monitoring.

Diagnocat: Facilitates 3D imaging analysis to assist implant planning and detect periodontal defects.

Ethical considerations specific to India

Patient consent and data privacy: Clear IC is crucial for AI data use, emphasizing transparency about data handling under Indian legal frameworks.

Bias and accessibility: AI algorithms trained on non-representative datasets risk inequity. Efforts are needed to diversify datasets and address rural access barriers.

Clinical oversight: AI supports but does not replace clinical judgment, requiring clinician training to interpret AI outputs responsibly.

Regulatory and social implications: The absence of comprehensive AI-specific healthcare regulations in India necessitates adherence to existing medical ethics, with proactive professional governance.

In conclusion, AI integration presents significant potential for advancing Indian periodontics, provided ethical deployment safeguards patient rights and promotes equitable care access.^[19,20] Table 1 is the concept of a formulated plan, and how to approach the decision-making. It is a six-step decision-making framework that can guide clinicians to reach a bioethical decision for a patient. In contrast, table 2 shows the same with a conceptualized framework for bioethical decision making with the help of a step approach to the problem. The framework below translates universal bioethical models to solve Indian-specific issues with the goal of making patient-centric, legally compliant, and culturally sensitive decisions.^[21]

- Begin: Patient comes in with Grade C periodontitis and needs advanced treatment (e.g., GTR).
- Decision Node 1 (Clinical): Is advanced GTR the sole life-saving mode?
 - Yes: Go to cost disclosure (Mandatory)
 - No: Provide non-surgical/basic surgical options (Ethical responsibility of Justice).
- Decision Node 2 (Cost and Justice): Is patient able to pay for Ideal treatment?
 - Yes: Go on to IC (Autonomy) for GTR
 - No: Provide and specify most cost-effective, clinically acceptable substitute (e.g., non-surgical therapy with intense maintenance).
- Decision Node 3 (Consent and Autonomy): Does the patient have full understanding of prognosis, procedure, and cost in their language?
 - No: Re-educate with visual aids and vernacular explanation. (Respects Autonomy)
 - Yes: Obtain signed, witnessed consent.
- End: Proceed with the patient's informed choice of treatment.

An example using the six-step ethical decision-making framework for a periodontal disease patient to illustrate the ethical framework in a practical context with a real-world patient centered on Indian sociocultural realities

and resource constraints [Table 2]. The absence of broad empirical data restricts generalizability. These limitations are acknowledged as inherent to the evolving scope of Indian clinical periodontics.

CONCLUSION

Bioethics in Indian Periodontics is a microcosm of India's national healthcare challenges, characterized by an ever-present tension between universal ethical ideals of patient rights and local realities of resource limitations and cultural expectations. While the underlying principles of autonomy, beneficence, non-maleficence, and justice continue to serve as the ethical compass, their application in everyday practice requires cultural competence and resilience against the forces of commercialization.

To raise the ethical standards of Indian Periodontics, this review recommends emphatically:

Mandatory, context-specific bioethics curriculum: The DCI must require a uniform bioethics curriculum in every dental college that targets specifically Indian legal systems, the effect of low literacy, and cultural dynamics in consent.

Standardized multilingual consent tools: Creation and extensive usage of DCI-sanctioned, visually enhanced, multilingual IC forms for routine periodontal and implant procedures to fill the communication gap.

Enhancing professional accountability: Professional bodies should more forcefully oversee and penalize unethical activities, especially misleading advertising and over-treatment for monetary profit, to enforce the DCI Code of Ethics.

Fostering distributive justice through public involvement: Periodontists, through professional associations such as the Indian Society of Periodontology, should place utmost importance and stress on advocating prevention and basic periodontal care public health programs to ensure that specialized skills are employed not just for gain but also for the general good.

Ethical approval: Institutional Review Board approval is not required.

Declaration of patient consent: Patient's consent is not required as there are no patients in this study.

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