Compiled by Johan Hartshorne[1] and Hugo Johan Kotzé[2]

Purpose: The purpose of the column is to highlight significant research findings, advancements, and clinical guidelines in dentistry, as published in the leading high-impact Dental and Medical Journals in 2026.

1. Prehabilitation in implant dentistry – a strategy for primordial prevention of peri-implant diseases

Field: Implant Dentistry / Periodontology

Methodology: Perspective Review

Clinical and Practical Significance:

- Prehabilitation, well established in medicine, refers to a multimodal strategy to optimize patients' physical, nutritional, and psychological status before implant placement to minimize the risk of peri-implant diseases (PIDs).
- It expands the prevention framework for implant dentistry into four levels: primordial, primary, secondary, and tertiary prevention, emphasizing risk control before surgery as the foundation for long-term peri-implant health.
- This concept mirrors medical prehabilitation protocols used before elective surgery and advocates for multidisciplinary, patient-centred risk reduction strategies.

Key Findings:

- Four-level prevention model:
  - Primordial prevention—before implant placement, focuses on avoiding risk factor development.
  - Primary prevention—maintains peri-implant health after placement through supportive peri-implant care (SPIC).
  - Secondary prevention—early management of peri-implant disease.
  - Tertiary prevention—rehabilitation after peri-implantitis.
- Prehabilitation approach: A multimodal, pre-surgical program combining behavioral, systemic, and local interventions to optimize patient readiness.
- Checklist highlights:
  - Patient education on implant risks and the role of SPIC.
  - Personalized oral hygiene and complete periodontal disease control.
  - Lifestyle modification—smoking cessation, improved nutrition, sleep hygiene, exercise, and stress management.
  - Systemic health optimization—glycemic control (HbA1c < 7%) and medical collaboration where needed.
  - Parafunction management (bruxism, clenching) and psychosocial stress reduction.
  - Local site optimization—adequate bone and ≥2 mm keratinized mucosa before surgery.
- If risk factors cannot be adequately modified, implant placement should be postponed or alternative prosthetic options considered.
- Prehabilitation thus complements primordial prevention by minimizing patient risk before rehabilitation begins.

Reference:

Carra MC, Bouchard P. Prehabilitation in implant dentistry: An essential strategy for primordial prevention of peri-implant diseases. J Periodontal Res. 2025; 60:1–4.
doi: 10.1111/jre.70048.
Available from: https://doi.org/10.1111/jre.70048

2. Convex versus concave emergence profile of implant-supported crowns in the aesthetic zone – 3-year results of an RCT

Field: Implant Dentistry

Methodology: Randomized Controlled Trial (3-year follow-up)

Clinical and Practical Significance:

- This 3-year RCT evaluated how emergence profile design (convex vs. concave) influences soft tissue stability around anterior single implants.
- The design of the transmucosal contour plays a critical role in maintaining mucosal level stability and minimizing recession risk.
- Most soft tissue changes occur within the first year after crown delivery, highlighting the importance of contour control during provisionalization.

Key Findings:

- Study groups: 47 patients received single implants in the aesthetic zone, randomized to Convex, Concave, or Control (no provisional/healing abutment).
- Mid-facial recession at 3 years: Convex (46.7%), Concave (13.3%), Control (40.0%).
- Risk of recession: The convex group had a 7.3-fold higher risk of mid-facial recession vs. the concave group
- Timing: The most recession occurred within the first year, with minimal change thereafter.
- Aesthetic outcomes: No significant overall PES differences, but 92% of concave restorations maintained a stable mucosal margin vs. 50% in convex designs.
- Bone stability: Marginal bone levels remained stable across all groups with no significant differences.
- Mucositis: Prevalence was highest in convex (53.8%) and lowest in concave (33.3%), though this is not statistically significant.

Concluding remarks:

Concave emergence profiles support coronal soft tissue adaptation and reduce recession risk in the aesthetic zone. In contrast, convex contours restrict soft tissue space, predisposing to recession.

Clinicians should prioritize concave transmucosal contours in anterior implant restorations to promote long-term soft tissue stability and aesthetic success.

Reference:

Endres J, Strauss FJ, Siegenthaler M, Naenni N, Jung RE, Thoma DS. Convex versus concave emergence profile of implant-supported crowns in the aesthetic zone: 3-year results of a randomized controlled trial. J Clin Periodontol. 2025;52:1605–1615. https://doi.org/10.1111/jcpe.70018.

3. Impact of implant abutment connection designs and cyclic loading on screw stability – systematic review and meta-analysis

Field: Implant Dentistry

Methodology: Systematic Review and Meta-analysis

Clinical and Practical Significance:

- This systematic review and meta-analysis examined how different implant–abutment connection designs behave under cyclic loading, focusing on screw stability.
- The authors compared external hex, internal hex, conical, and Morse taper connections across 21 in-vitro studies simulating functional loading
- The topic is relevant because screw loosening remains one of the most common technical complications in implant prosthodontics.

Key Findings:

- Internal conical connections consistently showed better resistance to screw loosening and maintained higher preload values after loading compared to external hex designs.

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- External connections were most prone to torque loss, particularly under off-axis loading and repeated fatigue cycles.
- Cyclic loading had a measurable impact across all systems, but internal and conical designs performed more predictably, with less variation in mechanical performance.
- Factors such as abutment material, torque re-tightening, and fit accuracy further influenced screw stability outcomes.

Reference:

Sammour SR, Ziqi X, Ogawa T, Yoda N. Impact of implant abutment connection designs and cyclic loading on screw stability in dental implants: A systematic review and meta-analysis. J Prosthet Dent. 2025; In Press. https://doi.org/10.1016/j.prosdent.2025.09.035.

4. Risk factors for implant failure in full-arch rehabilitation: 1–7 year retrospective study

Field: Implant Dentistry

Methodology: Retrospective Cohort Study

Clinical and Practical Significance:

- This extensive retrospective study evaluated 840 implants in 141 edentulous patients treated with immediate-load full-arch prostheses (All-on-4, -5, or -6).
- The study set out to determine implant survival rates and evaluate which factors most strongly contribute to implant failure in full-arch, implant-supported prostheses—both at the surgical stage and following definitive restoration.

Key Findings:

- Overall implant failure rate was 4.52% after 1–7 years, with a 7-year cumulative survival rate of 91.9% (95% CI: 88.4–95.6%).
- Bone grafting before definitive restoration was a significant risk factor, especially in the maxilla, likely due to delayed healing and infection risk.
- After prosthesis delivery, absence of a night guard, opposing natural/fixed dentition, and use of only four implants were significant predictors of failure.

Concluding Remarks:

Full-arch immediate-load rehabilitations remain a highly predictable treatment when risk factors are controlled.

Avoid grafted sites when possible, and ensure night guard compliance to reduce biomechanical complications and improve long-term implant survival.

Reference:

Chen Y, Pu R, Xia Z, Yu K, Wang Y, Jiang Z, Yang G. Risk factors for implant failure of implant-supported fixed full-arch rehabilitation in edentulous maxillae and mandibles: A 1–7-year retrospective study. J Dent. 2025;163:106146. https://doi:10.1016/j.jdent.2025.106146.

5. Gingivitis: the past, the present, the future

Field: Periodontology

Type: Perspective / Review

Clinical and Practical Significance:

- Gingivitis remains one of the most prevalent oral diseases worldwide, with most adults presenting with a form of gingival inflammation.
- Understanding its evolution helps clinicians appreciate the shift from simple plaque-control strategies to host-centred and technology-driven prevention and treatment.

Key findings:

The Past:

- The 1960s experimental gingivitis model established the cause-and-effect link between plaque accumulation and gingival inflammation.
- For decades, gingivitis was viewed as a uniform, plaque-driven condition, with severity thought to depend solely on plaque quantity or composition.
- Later research revealed consistent inter-individual inflammatory profiles under standardized plaque conditions — identifying stable "high" and "low responders."
- Genetic and immunologic studies linked cytokine polymorphisms (especially IL-1 cluster genes) and elevated inflammatory mediators (IL-1β, calprotectin, PGE_2) to stronger host responses.

The Present:

- The 2017 World Workshop introduced standard diagnostic thresholds:
  - Bleeding on probing (BoP) ≥10%,
  - Probing depth ≤3 mm,
  - No attachment or bone loss.
- BoP remains the primary diagnostic marker — straightforward, reproducible, and important for patient communication.
- Variability in inflammation highlights host susceptibility and possible links to disease progression.
- Gingivitis is now acknowledged as systemically significant, linked to increased CRP and IL-6 levels.
- Modern care focuses on personalized plaque control, combining effective self-care, professional maintenance, and behavioural support through patient-centred education.

The Future:

- The future of gingivitis care will be driven by digital innovation, precision medicine, and integrated prevention.
- While BoP will remain a reference point, it may be complemented by objective, technology-assisted diagnostics.
- Digital intraoral scans and automated colorimetric analysis show strong potential for detecting gingival inflammation with high reproducibility.
- Photographic and 3D plaque mapping tools could provide visual feedback that motivates patients and improves home care compliance.
- The next frontier lies in combining imaging, salivary biomarkers, microbiome profiles, and genetic risk factors to create personalized risk scores using AI-driven algorithms.
- App-based monitoring and wearable biosensors may enable continuous, real-time assessment of gingival health.
- Gingivitis management is moving toward a data-driven, minimally invasive, and preventive model, integrated within general healthcare and aimed at early detection and long-term stability.

Reference:

Trombelli L. Gingivitis: The past, the present, the future. J Periodontal Res. 2025; 60: 851–853. https://doi.org/10.1111/jre.70041

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