

NiTi Brush 싹쓸이로 오염된 임플란트의 거친 표면을 기계적으로 debridement 및 polishing 하신 후 선택할 수 있는 화학적 처치에 대한 임상 예시

임플란트주위염_싹쓸이 버_NiTi(니켈 티타늄) Brush · 임플란트주위염 치료에 NiTi Brush-싹쓸이(버)를 사용한 논문들의 화학적 처치에 대한 예시

Adjunctive chemical protocols reported after mechanical debridement with the NiTi Brush · literature summary

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목적

NiTi Brush로 기계적 처치를 한 뒤 무엇을 해야 하는지 자주 질문을 받습니다. 그 질문들에 "정답은 이것입니다"라고 답변드리 는 것은 불가능합니다. 다만, "NiTi Brush_싹쓸이"를 기계적 처치 수단으로 채택한 여러 편의 임상 논문을 통해 해당 논문의 저 자들이 브러싱 후 실제로 무엇을 했는지, 즉 약제, 농도, 적용 시간, 그리고 그 뒤에 보고된 결과가 어떠했는지를 논문별로 정리하 여, 선생님들의 임상적 판단에 도움을 드리고자 합니다. 따라서 원문을 확인할 수 있도록 이하 논문별 정리는 영문 그대로 두었습 니다.

본 문건은 한스코리아가 작성한 문헌 정리이며, 임상적 권장사항이 아니며 사용설명서(IFU)를 대체하지도 않습니다. 임상에 적용하시 는 화학적·약리학적 보조 처치의 선택 및 농도, 적용 시간은 치료하시는 선생님의 임상적 판단 영역이며, 해당 약제의 허가사항과 관 련 법규에 따라야 합니다. 본 문건에 기술된 농도·시간·수치는 논문에서 옮겨 적은 것이므로 검증을 위해 임상 적용 전 원문으로 확인 하시길 바랍니다. 한스코리아는 인용 논문의 저작권을 보유하지 않으며, 저자·학술지와 무관하며, 논문에서 제시하는 방법 및 결과 등 은 당사의 해석에 근거하여 작성하였습니다. 원문은 각 항목에 링크된 DOI에서 보실 수 있습니다. 본 문건과 사용설명서가 다를 경우 사용설명서가 우선합니다.

At a glance

A	Saline irrigation only — no chemical agent on the surface	6 reports · 3 RCT-based (Gothenburg / Bilbao group), 2 cohorts (Frankfurt), 1 case report	All combined with a systemic antibiotic and/or a post-operative chlorhexidine mouthwash
B	Hydrogen peroxide 3 % for 2 min, then saline	3 reports · Monje et al. (Barcelona)	Also the control arm of the two electrolytic trials in group D
C	Chlorhexidine as the adjunct (0.12 % irrigation or 2-min rinse; 0.2 %)	3 reports	Once after H2O2, once after glycine air-polishing, once QLF-guided
D	Electrolytic decontamination for 2 min, then saline	2 reports · multicentre RCT vs H2O2; case series adding rhPDGF-BB	Resolution 87.5 % vs 64.5 % with H2O2 in the multicentre RCT (p = 0.08)

Common to every clinical report: a full-thickness access flap, complete removal of granulation tissue, mechanical decontamination of the exposed surface with the NiTi Brush (600 rpm for 2–3 minutes in the Barcelona studies; up to

1,200 rpm under continuous saline in the Gothenburg/Bilbao and Frankfurt studies), and saline irrigation before grafting or closure. Where reported, the brush model was NANO (Gothenburg/Bilbao), ICT Micro and ICT Nano (Marseille) or OMEGA (Makkah).

A. Mechanical debridement only — saline irrigation, no chemical agent on the surface

01 Reconstructive surgical therapy of peri-implantitis: a multicentre randomised controlled clinical trial

Derks J, Ortiz-Vigón A, Guerrero A, et al. Clinical Oral Implants Research, 2022.
<https://doi.org/10.1111/clr.13972>

DESIGN	Multicentre RCT · 138 patients / 147 implants · 12 months · Sweden · Spain · Italy
MECHANICAL STEP	Titanium cures, then a rotating NANO NiTi Brush (HANS Korea) at up to 1,200 rpm under continuous saline irrigation.
AFTER BRUSHING	None. No chemical agent applied to the implant surface.
SYSTEMIC / POST-OP REPORTED OUTCOME	Amoxicillin 750 mg twice daily for 10 days, started 3 days before surgery. PPD reduction 3.7 mm and marginal bone gain about 1.0 mm in both groups; BOP reduced by 45–50 %. Bone substitute (test) did not add a clinical benefit; buccal recession was smaller in the test group.

02 Bone substitute material in the surgical therapy of peri-implantitis: 3-year outcomes of a randomised controlled trial

Alibegovic L, Trullenque-Eriksson A, Ortiz-Vigón A, et al., Derks J. Clinical Oral Implants Research, 2025.
<https://doi.org/10.1111/clr.14393>

DESIGN	Same trial, 3-year follow-up · 120 patients / 127 implants · Sweden · Spain · Italy
MECHANICAL STEP	As above — titanium cures and NANO NiTi Brush (HANS Korea) under saline.
AFTER BRUSHING	None.
SYSTEMIC / POST-OP REPORTED OUTCOME	As above. At 3 years: PPD reduction 3.2–3.5 mm, marginal bone gain 1.1–1.3 mm; disease resolution (permissive definition) at 39 % of implants; 11 % of implants lost. No clear benefit of the bone substitute over access flap alone.

03 The adjunctive effect of a resorbable membrane to a xenogeneic bone replacement graft in the reconstructive surgical therapy of peri-implantitis

Regidor E, Ortiz-Vigón A, Romandini M, Dionigi C, Derks J, Sanz M. Journal of Clinical Periodontology, 2023.
<https://doi.org/10.1111/jcpe.13796>

DESIGN	RCT · 43 patients · 12 months · Spain
MECHANICAL STEP	Titanium cures, then a rotating NANO NiTi Brush (HANS Korea) at up to 1,200 rpm under continuous saline irrigation.
AFTER BRUSHING	None on the surface. (Pre-surgical non-surgical phase: air-polishing with erythritol powder containing 0.3 % chlorhexidine.)
SYSTEMIC / POST-OP	Amoxicillin 750 mg twice daily for 10 days from 3 days pre-op; post-operative rinse with 0.12 % chlorhexidine + 0.05 % cetylpyridinium chloride.
REPORTED OUTCOME	No implant lost; treatment success 36.8 % (membrane) vs 45.0 % (no membrane), no significant difference in PPD, BOP, bone level or recession. Membrane added surgical time, pain and complications.

04 Volumetric assessment of tissue changes following combined surgical therapy of peri-implantitis: a pilot study

Schwarz F, et al. Journal of Clinical Periodontology, 2021.

<https://doi.org/10.1111/jcpe.13335>

DESIGN	Prospective pilot · 20 patients · 6 months · Germany
MECHANICAL STEP	Granulation tissue removal; exposed surface decontaminated with a titanium brush (HANS Korea); implantoplasty of supracrestal/buccal parts under sterile saline.
AFTER BRUSHING	None on the surface.
SYSTEMIC / POST-OP REPORTED OUTCOME	Single pre-operative dose of amoxicillin 2 g; 0.12 % chlorhexidine mouthwash daily for 5 days. Peri-implant soft tissue contracted 7.9 % (1 month) and 18.5 % (6 months); contraction was associated with a narrow band of keratinised mucosa.

05 Effectiveness of modified and control protocols for the surgical therapy of combined peri-implantitis-related defects: a retrospective analysis

Schwarz F, et al. Clinical Oral Implants Research, 2023.

<https://doi.org/10.1111/clr.14057>

DESIGN	Retrospective · 36 patients / 40 implants · 12 months · Germany
MECHANICAL STEP	Granulation tissue removal; titanium brush (HANS Korea); implantoplasty at supracrestal/buccal components under sterile saline.
AFTER BRUSHING	None on the surface.
SYSTEMIC / POST-OP REPORTED OUTCOME	0.12 % chlorhexidine mouthwash daily for 5 days after surgery. Median BOP reduction 58–67 % and PD reduction 0.8–2.0 mm across the three protocols at 12 months; 100 % implant survival.

06 Management of early dental implant complication: a report of two cases

Babgi W, Felemban B. Journal of Umm Al-Qura University for Medical Sciences, 2024.

<https://doi.org/10.54940/ms75920247>

DESIGN	Case report · 2 patients · Saudi Arabia
MECHANICAL STEP	NiTi Brush OMEGA (HANS Korea) on a low-speed handpiece; site irrigated with saline; bone substitute + collagen membrane.
AFTER BRUSHING	None on the surface.
SYSTEMIC / POST-OP REPORTED OUTCOME	Amoxicillin 500 mg for one week after surgery; chlorhexidine mouthrinse for one week. Peri-implant health re-established in both early-complication cases.

B. Hydrogen peroxide 3 % for 2 minutes, then irrigation

07 Significance of barrier membrane on the reconstructive therapy of peri-implantitis: a randomised controlled trial

Monje A, Pons R, Vilarrasa J, Nart J, Wang H-L. Journal of Periodontology, 2023.

<https://doi.org/10.1002/JPER.22-0511>

DESIGN	RCT · 33 patients / 48 implants · 12 months · Spain
MECHANICAL STEP	Mini-five and Gracey curettes; NiTi brushes (HANS Korea) for about 2–3 min at 600 rpm; implantoplasty of uncontained components.
AFTER BRUSHING	Hydrogen peroxide 3 % for 2 minutes, then saline irrigation.
SYSTEMIC / POST-OP REPORTED OUTCOME	Not the subject of the report. Disease resolution 77.1 % at 12 months; the barrier membrane did not raise the probability of resolution; baseline plaque index and keratinised mucosa width did.

08 Defect angle as prognostic indicator in the reconstructive therapy of peri-implantitis

Monje A, Pons R, Sculean A, Nart J, Wang H-L. Clinical Implant Dentistry and Related Research, 2023.
<https://doi.org/10.1111/cid.13244>

DESIGN	Secondary analysis of the RCT above · 33 patients / 48 implants · Spain
MECHANICAL STEP	NiTi brushes (HANS Korea) for about 2–3 min at 600 rpm.
AFTER BRUSHING	Hydrogen peroxide 3 % for 2 minutes, then saline irrigation.
SYSTEMIC / POST-OP REPORTED OUTCOME	As above. Radiographic bone gain 1.85 mm on average; a baseline defect angle below 57° predicted at least 1 mm gain and below 30° predicted at least 2 mm gain.

09 Electrolytic surface decontamination in the reconstructive therapy of peri-implantitis: single-centre outcomes of a randomised controlled trial

Monje A, Pons R, Peña P. International Journal of Periodontics & Restorative Dentistry, 2025.
<https://doi.org/10.11607/prd.7151>

DESIGN	Single-centre arm of a multicentre RCT · 19 patients / 23 implants · 12 months · Spain
MECHANICAL STEP	NiTi brushes (HANS Korea) — mechanical decontamination in both arms.
AFTER BRUSHING	Control: hydrogen peroxide 3 %. Test: electrolytic method (see group D). Both followed by saline.
SYSTEMIC / POST-OP REPORTED OUTCOME	Not the subject of the report. No significant difference in clinical or radiographic parameters between the two adjuncts; disease resolution about 16 % higher with the electrolytic adjunct (about 91 %), not statistically significant.

C. Chlorhexidine as the adjunct

10 Resolution of peri-implantitis by means of implantoplasty as adjunct to surgical therapy: a retrospective study

Monje A, Pons R, Amerio E, Wang H-L, Nart J. Journal of Periodontology, 2022.
<https://doi.org/10.1002/JPER.21-0103>

DESIGN	Retrospective · 43 patients / 135 implants · about 24 months · Spain
MECHANICAL STEP	Reconstructive cases: mini-five and Gracey curettes and NiTi brushes (HANS Korea); implantoplasty of supracrestal parts.
AFTER BRUSHING	Hydrogen peroxide 3 % for 2 minutes, then irrigation with chlorhexidine 0.12 %. (Non-surgical phase 6 weeks earlier: sub-mucosal irrigation with chlorhexidine 0.12 %.)
SYSTEMIC / POST-OP REPORTED OUTCOME	Not the subject of the report. Implant survival 97.8 %; therapeutic success 66 % (strict) and 79.5 % (flexible definition); apically positioned flap groups resolved disease most efficiently.

11 Absence of progressive bone loss following peri-implantitis surgical therapy with implantoplasty: a case series

Brincat A, Antezack A, Sadowski C, Faure-Brac M, Ohanessian R, Monnet-Corti V. Applied Sciences, 2023.
<https://doi.org/10.3390/app13127224>

DESIGN	Case series · 57 patients / 91 implants · 12–42 months (mean 24) · open access · France
MECHANICAL STEP	Implantoplasty under sterile saline; NiTi brushes ICT Micro and ICT Nano (HANS Korea) and glycine-powder air-polishing.
AFTER BRUSHING	Chlorhexidine 0.12 % rinses for 2 minutes, then profuse sterile saline irrigation to remove residual titanium particles.
SYSTEMIC / POST-OP	Amoxicillin 2 g/day for 7 days from the day before surgery; prednisolone 1 mg/kg/day for 3 days; chlorhexidine 0.2 % rinse 7 days then 0.12 % for 7 days, plus 0.2 % gel for 10 days.
REPORTED OUTCOME	Absence of progressive bone loss at 96.7 % of implants (100 % reconstructive, 98 % combined, 92.9 % apically repositioned flap); 3 implants removed.

12 Diagnosis and treatment improvement of peri-implantitis using quantitative light-induced fluorescence (QLF)

Yun J-H, et al. Journal of the Korean Dental Association 63(6):181–189 (Korean, CC BY-NC-ND), 2025.
<https://doi.org/10.22974/jkda.2025.63.6.001>

DESIGN	Case report · 2 cases · Korea
MECHANICAL STEP	Ultrasonic scaler tips, NiTi brush (HANS Korea) and air-powder abrasion; QLF imaging used to check residual biofilm and repeat cleaning where needed.
AFTER BRUSHING	Chlorhexidine 0.2 % applied after decontamination.
SYSTEMIC / POST-OP	Not reported here.
REPORTED OUTCOME	QLF revealed residual biofilm not visible to the eye and guided additional cleaning; inflammation controlled in both cases.

D. Electrolytic decontamination as the adjunct — head-to-head with hydrogen peroxide, and with a biologic

13 Surface decontamination on the reconstructive therapy of peri-implantitis: a multicentre randomised clinical trial

Monje A, Navarro-Mesa S, Soldini C, Zappalá G, Peña P, Navarro JM, Pons R. Clinical Implant Dentistry and Related Research, 2025.
<https://doi.org/10.1111/cid.70075>

DESIGN	Multicentre RCT · 58 patients · 12 months · open access · Spain · USA
MECHANICAL STEP	Steel curettes; NiTi brushes (HANS Korea) at 600 rpm for about 2–3 min in both arms.
AFTER BRUSHING	Test arm: electrolytic method for 2 minutes, then saline irrigation. Control arm: hydrogen peroxide 3 % for 2 minutes, then saline irrigation.
SYSTEMIC / POST-OP	Not the subject of the report.
REPORTED OUTCOME	All clinical indices and marginal bone level improved significantly in both arms; disease resolution 87.5 % (electrolytic) vs 64.5 % (hydrogen peroxide), p = 0.08. No major complications.

14 Recombinant human platelet-derived growth factor-BB-mediated reconstructive therapy of advanced peri-implantitis bone defects: a case series

Monje A, Pons R, Barootchi S, Saleh MHA, Rosen PS, Sculean A. International Journal of Oral Implantology 18(1):47–57, 2025.

PubMed 40047362 — <https://pubmed.ncbi.nlm.nih.gov/40047362/>

DESIGN	Prospective case series · 10 patients / 13 advanced defects (at least 50 % bone loss) · 12 months · USA · Spain
MECHANICAL STEP	NiTi brushes (HANS Korea) for about 2–3 min at 600 rpm on the intrabony component.
AFTER BRUSHING	Electrolytic method for 2 minutes, then saline irrigation, then rhPDGF-BB applied to the implant surface before grafting.
SYSTEMIC / POST-OP REPORTED OUTCOME	Not the subject of the report. Implant survival 100 %; mean pocket depth reduced by 4.5 mm; defects narrower and shallower at 1 year; disease resolution 61.5 % at implant level.

Background reading — reviews and laboratory work

Montero E, Rocuzzo A, Molina A, Monje A, Herrera D, Rocuzzo M. Periodontology 2000 91:199–216 (review), 2022.

<https://doi.org/10.1111/prd.12460>

Narrative review of minimally invasive reconstructive treatment. Describes a flapless technique that combines chemical decontamination with hydrogen peroxide and mechanical decontamination with a titanium brush, and tabulates the agents used across the clinical literature (hydrogen peroxide 3 %, chlorhexidine 0.2 %, tetracycline, enamel matrix derivative, electrolytic cleaning).

Brunello G, Becker K, Rauch N, Schwarz F, Becker J. Clinical Implant Dentistry and Related Research 27:e13417 (in vitro), 2025.

<https://doi.org/10.1111/cid.13417>

Titanium discs treated with NiTi brushes, diamond polishing brushes or a phenol/sulfuric-acid gel. The gel did not alter surface morphology, whereas both brushes did; cell viability after 7 days was highest on NiTi-brushed discs stored in saline. Operative time was shorter for NiTi than for the polishing brush.

How this summary was prepared

Inclusion. A paper is listed only when its Methods identify the mechanical instrument as the NiTi Brush of HANS Korea and describe what was applied to the surface afterwards. Studies using other titanium brushes are not included, even where the protocol is similar.

Wording. Every line is written by HANS Korea from the paper's Methods and Results. Nothing is quoted or reproduced; figures and tables of the papers are not copied. Concentrations, times and outcome figures are transcribed as the authors reported them.

What is not here. Non-surgical protocols, the composition of grafting materials and membranes, and post-operative maintenance schedules are outside the scope, except where they bear directly on the surface adjunct.

Currency. The list reflects papers verified by HANS Korea as of the date on the cover. It is a floor, not a census; when a further paper names the instrument, it is added.