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Anchoring the Crown: Omega Loop Post for Strip Crown Reconstruction in Severe Early Childhood Caries: A Case Report

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Abstract: Severe early childhood caries can leave insufficient tooth structure to retain restorations of primary anterior teeth. This case describes the use of omega-loop posts for intracanal retention of composite resin strip crowns following pulpectomy. We reported a 3-year-old girl presented with extensive carious destruction of the maxillary anterior teeth and fracture of one tooth after a fall. Clinical and radiographic examinations revealed pulp necrosis in both maxillary primary central incisors. Both teeth underwent pulpectomy, followed by omega-loop post placement and strip crown reconstruction to restore form, aesthetics, and function. The technique involved simple chairside fabrication and limited treatment time, supporting restoration despite substantial loss of coronal tooth structure. All procedures were performed chairside without general anaesthesia through brief, staged visits with age-appropriate behavioral guidance. At approximately three months after rehabilitation, all crowns were clinically satisfactory. At the latest follow-up, 10 months after restoration of tooth 51 and 8 months after restoration of tooth 61, both omega-loop-supported crowns remained intact and adequately retained, without clinically detectable mobility, gingival swelling, abscess, or recurrent caries. In conclusion, omega-loop-supported crowns maintained satisfactory short-term retention despite extensive coronal loss. This case supports clinical feasibility but cannot establish long-term durability or superiority over other post systems.
Keywords: intracanal post; omega loop; severe early childhood caries; strip crown

INTRODUCTION

Severe early childhood caries (S-ECC) represents the most destructive clinical spectrum of early childhood caries (ECC) and remains a substantial oral health burden among preschool children. According to the American Academy of Pediatric Dentistry (AAPD), S-ECC is defined by age-specific criteria involving smooth-surface caries and caries experience in the primary dentition.[1] The global burden of ECC remains considerable. In a systematic review and meta-analysis using the World Health Organization diagnostic criteria, Uribe et al[2] reported a pooled global ECC prevalence of 48% among preschool children, with marked variation across geographic regions. More recent evidence from Maklennan et al[3] yielded a comparable pooled prevalence of approximately 49%, further confirming the persistent global burden of ECC. In Indonesia, Hasan et al[4] reported an overall dental caries prevalence of 76% among 8,840 children included in 27 studies. Although this estimate represents dental caries in children rather than S-ECC specifically, it highlights the substantial caries burden in the Indonesian pediatric population. Recent epidemiological data from West Java further demonstrated ECC prevalence of 91.8% among children aged 2–6 years in Bandung Regency and 96.1% in Pangandaran Regency, with mean def-t indices of 10.03 and 10.74, respectively.[5]

The consequences of S-ECC become particularly significant when extensive carious destruction compromises the coronal structure of primary anterior teeth. Severe tissue loss may leave insufficient enamel and dentin for predictable adhesive retention and may be accompanied by pulpal necrosis and periapical infection. For restorable primary teeth with necrotic pulp, pulpectomy is an established nonvital pulp treatment that aims to control infection and retain the tooth until physiological exfoliation.[6] However, endodontic treatment does not restore the substantial coronal tissue lost to S-ECC. Definitive coronal reconstruction is therefore required to re-establish tooth morphology and function and to provide an adequate coronal seal. When the remaining coronal structure is insufficient to retain a conventional restoration, intracanal posts may provide additional mechanical retention for the restorative core.[7] Nevertheless, the evidence supporting a specific post system remains limited. Mittal et al[7] reported in a systematic literature review that the available evidence for intracanal reinforcement of grossly damaged primary anterior teeth was limited by the small number of eligible studies and high risk of bias.

Several post designs have been proposed for severely damaged primary anterior teeth, including fiber, composite, metal, and omega-loop posts.[7,8] The omega-loop design can be fabricated chairside from stainless steel orthodontic wire and adapted to the remaining tooth structure, providing a relatively simple and accessible means of increasing mechanical retention.[9] Arora et al[9] reported the clinical use of modified omega-loop posts followed by celluloid strip crowns in severely decayed primary maxillary anterior teeth, supporting the clinical feasibility of this approach. However, this evidence remains limited to case-based observations and does not establish superiority over other post systems. In vitro evidence comparing Ribbond, omega-loop, and glass fiber posts likewise found no statistically significant difference in fracture resistance among the groups.[8] Thus, the clinical rationale for an omega-loop post lies primarily in its feasibility and retention potential rather than demonstrated mechanical superiority.[8,9] For coronal reconstruction, composite resin strip crowns remain an established esthetic option for pulp-treated primary anterior teeth. A systematic review by Amend et al[10] reported annual failure rates of 0–2.3% for composite strip crowns used after pulpectomy, although all included studies addressing these restorations were considered to have a high risk of bias.[10]

Recent evidence supports intracanal post-supported restoration as a viable approach for severely damaged primary anterior teeth requiring endodontic treatment. In a 2025 systematic review and meta-analysis, Oliveira et al[11] reported a satisfactory outcome for intracanal post-supported restorations in endodontically treated primary anterior teeth, although the certainty of evidence was low. The omega-loop post offers a practical approach to enhance retention when extensive coronal destruction limits conventional adhesive restoration. Its fabrication from stainless steel orthodontic wire allows chairside adaptation to the remaining tooth structure, while

its relatively simple technique may facilitate clinical application.[9] Arora et al[9] previously described the use of a modified omega-loop post followed by a celluloid strip crown after endodontic treatment of severely decayed primary anterior teeth, demonstrating the feasibility of this combination for re-establishing tooth form, function, and esthetics. However, the available evidence remains limited and does not establish the omega-loop post as superior to other intracanal post systems.[8,9] When combined with a composite resin strip crown, the intracanal post provides retention for the restorative core, whereas the strip crown reconstructs the lost coronal anatomy and external form.[9,10] Therefore, this case report describes the clinical application of an omega-loop intracanal post combined with a composite resin strip crown following pulpectomy in severely damaged primary anterior teeth associated with S-ECC, with clinical follow-up extending to approximately 10 and 8 months after restoration of teeth 51 and 61, respectively.

CASE REPORTS

A 3-year-old female patient presented to the Poliklinik Kedokteran Gigi Anak at Rumah Sakit Gigi dan Mulut Fakultas Kedokteran Gigi Universitas Padjajaran, Bandung, Indonesia, with the chief complaint of a fractured maxillary right primary central incisor (tooth 51) that had occurred four days prior due to a fall. The medical history was non-contributory. The patient's mother reported frequent sucrose intake and inadequate oral hygiene practices. Clinical and panoramic radiographic examinations revealed extensive coronal destruction associated with dental caries in the maxillary anterior teeth. Pulp necrosis was identified in teeth 51 and 61. Multisurface dentin caries lesions were also present in teeth 54, 55, 53, 52, 62, 64, 65, 74, 72, 71, 82, and 81 (Figure 1). The overall clinical presentation was consistent with S-ECC with extensive involvement of the primary dentition.

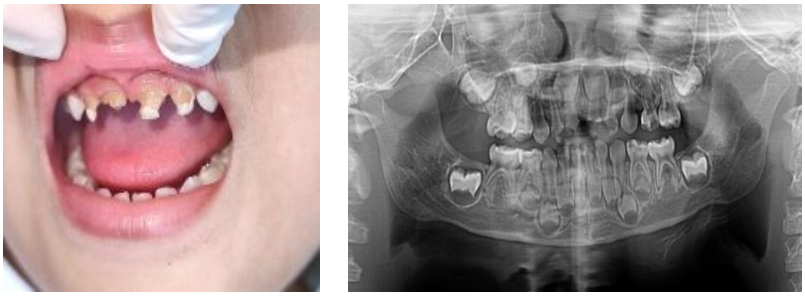


Figure 1. Initial clinical condition and radiographic findings

The treatment plan consisted of glass-ionomer restorations for teeth 54, 64, 65, and 74, and a fissure sealant for tooth 55, composite restorations for teeth 53, 72, 71, 81, and 82, and composite strip crowns for teeth 52 and 62, and pulpectomy followed by omega-loop post placement and composite resin strip crown reconstruction for teeth 51 and 61 because of the extensive coronal destruction and minimal remaining coronal structure. Treatment planning also considered the family's financial limitations, favoring a restorative approach that could be completed chairside using readily available materials without laboratory fabrication.

Treatment was performed in brief, staged chairside visits without general anesthesia, with age-appropriate behavioral guidance at every appointment and procedures adapted to the child's cooperation. Treatment initially focused on tooth 51 because of swelling and mobility following trauma. Following root canal instrumentation, calcium hydroxide was placed as an interappointment dressing. As swelling subsided, the dressing was renewed, while teeth 52 and 62 were restored with composite strip crowns and tooth 53 with composite resin. Once tooth 51 was asymptomatic and mobility had resolved, its canal was obturated with zinc oxide–eugenol cement (Kalzinol) and temporarily sealed. During the early treatment visits, tooth 55 also received a fissure sealant, and teeth 64 and 65 were restored with glass-ionomer cement.

Definitive reconstruction of tooth 51 was then undertaken because the remaining coronal

structure provided insufficient retention for a conventional strip crown. An omega-loop post was fabricated chairside from 0.16-mm stainless steel orthodontic wire, initially cut to approximately 1.5 cm. Using bird-beak pliers, the wire was shaped into an omega loop, adapted to the canal orifice, and trimmed, with the free ends bent outward.

To accommodate the post, approximately 3–4 mm of cervical root canal filling material was removed after obturation, and a thin layer of zinc phosphate cement was applied as a sealing layer. The post was trial-fitted and cemented with type II glass-ionomer cement, which was also used for core build-up (Figure 2). Its intracanal extension was confined to the cervical portion of the canal to provide retention while preserving the apical filling.



Figure 2. Omega-loop post placement and core build-up procedure

To restore tooth 51, a cellulose acetate strip crown with a palatal vent hole was prepared. The tooth was etched with 37% phosphoric acid for 15 seconds, followed by application of a bonding system. The strip crown was filled with composite resin, seated under finger pressure, and cleared of excess material. Light curing was performed for 20 seconds on the facial surface and 20 seconds on the palatal surface. After polymerization, the acetate form was removed with an explorer. The restoration was contoured, occlusal interferences were eliminated, and finishing and polishing were performed with diamond finishing burs, Sof-Lex discs, and interdental strips.

Treatment subsequently continued on the other carious teeth, including restoration of tooth 54. An initial attempt to begin pulpectomy of tooth 61 was deferred when the child became distressed and uncooperative. At later visits, tooth 61 underwent canal instrumentation and an interappointment calcium hydroxide dressing, followed by zinc oxide–eugenol obturation. An omega-loop post, glass-ionomer core, and composite strip crown were then placed using the technique described for tooth 51. Finally, the remaining mandibular anterior teeth (72, 71, 81, and 82) were restored with composite resin, and fluoride varnish and caregiver counseling on diet, toothbrushing, and oral hygiene completed the rehabilitation (Figure 3).

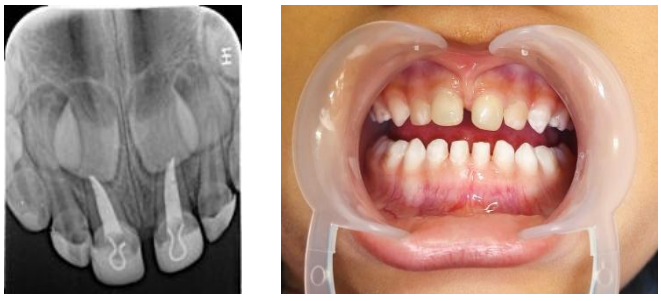


Figure 3. Post-treatment clinical condition and radiographic findings

At approximately three months after completion of comprehensive rehabilitation, all crowns remained clinically satisfactory, and the strip crowns on teeth 51 and 61 remained intact and adequately retained. Occlusion remained stable, and no restoration fracture or detachment was observed. No clinically evident signs of recurrent infection or abnormal mobility were detected.

At the latest follow-up, approximately 10 months after restoration of tooth 51 and 8 months after restoration of tooth 61, both teeth remained clinically stable (Figure 4). Teeth 51 and 61 showed no clinically detectable mobility, discoloration, gingival swelling, or abscess formation. The strip crown restorations remained intact and adequately retained. No clinically detectable recurrent caries was observed around the restored teeth. Restoration color remained satisfactory, and occlusion and anterior tooth function were maintained. The patient reported no complaints.



Figure 4. Clinical condition approximately 10 months after reconstruction of tooth 51 and 8 months after reconstruction of tooth 61, showing intact omega-loop-supported strip crowns and favorable clinical stability

DISCUSSION

Management of severe early childhood caries (S-ECC) involving primary anterior teeth becomes particularly challenging when extensive coronal destruction leaves insufficient sound tooth structure for predictable adhesive retention.[12] In the present case, teeth 51 and 61 exhibited extensive coronal destruction and pulpal necrosis. Pulpectomy allowed preservation of the restorable teeth, consistent with current pediatric guidance for nonvital primary teeth,[6] but did not address the limited coronal structure available for subsequent restoration. Resin-bonded strip crowns depend substantially on the amount of sound tooth structure available for bonding, and Grewal et al[12] reported greater failure in primary incisors with extensive coronal destruction and limited residual bonding surface. Therefore, additional intracanal retention was considered necessary to support coronal reconstruction in this patient.[7,8]

The selection of an omega-loop post was based primarily on practical and patient-specific considerations rather than presumed superiority over other post systems. The omega-loop can be fabricated chairside from stainless steel orthodontic wire and adapted directly to the remaining tooth structure.[9,13] Its relatively simple fabrication and clinical application were advantageous in this young child, in whom limiting procedural complexity and chairside time was desirable. The family's financial circumstances were also considered; consequently, a technique using readily available materials without laboratory fabrication was preferred. All procedures were performed chairside without general anesthesia. Age-appropriate behavioral guidance was used throughout treatment to keep sessions brief and defer procedures when cooperation was insufficient. This treatment selection was case-specific and should not be interpreted as evidence of greater cost-effectiveness, as no formal cost analysis was performed.

Importantly, the mechanical rationale for using an omega-loop should be distinguished from a claim of superior mechanical performance. Nilavarasan et al[8] found no statistically significant difference in fracture resistance among Ribbond, omega-loop, and glass fiber posts in primary anterior teeth, and systematic evidence has not established one intracanal reinforcement technique as clearly superior.[7,8] Thus, the principal role of the omega-loop in the present case was to provide additional retention through a simple wire-based configuration that could be adapted to the limited residual tooth structure. Arora et al[9] similarly described the use of a modified omega-loop post followed by a celluloid strip crown in severely decayed primary anterior teeth, providing clinical precedent for the restorative combination used in this case.

The limited intracanal extension of the post was also an important biological consideration because primary teeth undergo physiologic root resorption and are eventually replaced by their

permanent successors.[13] Accordingly, intracanal post placement should remain conservative and take into account the remaining root structure, degree of root resorption, and position of the developing permanent successor.[13] In the present case, the intracanal portion of the omega-loop was restricted to approximately 3–4 mm within the cervical portion of the canal, with the intention of providing mechanical retention while limiting extension toward the apical portion of the root. A previous clinical report similarly described a short omega-loop extension confined to the cervical portion of the canal.[9] Nevertheless, because no radiographic examination was obtained at the latest follow-up, the present case cannot determine whether the post affected subsequent physiologic root resorption or the developing permanent successors.

Composite resin strip crowns were selected for coronal reconstruction because they provide a direct esthetic restorative option for primary anterior teeth.[10,12] Their success, however, is strongly influenced by the amount of sound tooth structure available for bonding.[12] This consideration was particularly relevant in the present patient and supported the addition of intracanal retention rather than reliance on adhesive retention alone. Alternative full-coronal restorations should also be considered. In a 36-month randomized controlled trial, prefabricated zirconia crowns demonstrated superior retention and anatomical contour compared with resin-bonded composite strip crowns, with survival rates of 100% and 87%, respectively.[14] Nevertheless, the strip crown was clinically suitable in this case because it permitted direct chairside reconstruction and could be integrated with the selected omega-loop retention approach. Thus, restorative selection should remain individualized according to the residual tooth structure, restorative requirements, and patient-related considerations.

At treatment completion, at approximately three months after rehabilitation, and at the latest follow-up (approximately 10 months for tooth 51 and 8 months for tooth 61 after restoration), both omega-loop-supported strip crowns remained intact and adequately retained, with stable occlusion and no clinically detectable mobility, restoration detachment, gingival swelling, or abscess formation. This short-term stability is consistent with previous reports demonstrating the clinical feasibility of omega-loop-supported restorations in severely damaged primary anterior teeth.[9] Moreover, a recent systematic review and meta-analysis reported satisfactory outcomes for intracanal post-supported restorations in endodontically treated primary anterior teeth, although the certainty of evidence remained low.[11] Therefore, the present findings support the clinical feasibility and short-term stability of the technique in this patient but cannot establish long-term survival or comparative effectiveness.

Preventive management remained an integral component of treatment because ECC is a multifactorial disease influenced by dietary, microbial, oral-hygiene, behavioral, environmental, and social factors.[15,16] The improvement in oral hygiene observed during follow-up occurred in conjunction with dietary counseling, oral-hygiene education, fluoride application, and maintenance care, and therefore should not be attributed to the omega-loop post or strip crown itself. Restorative treatment alone does not address the underlying determinants of ECC and should be accompanied by continued preventive measures to reduce subsequent disease activity.[1,15,16] Patient and parent reported observations provided additional context, the child showed greater toothbrushing motivation, while the parents reported satisfaction with the esthetic and functional outcome and perceived greater comfort during biting. Previous qualitative evidence indicates that anterior caries can negatively affect children and their families and that mothers may perceive positive changes following oral rehabilitation.[17] However, because the observations in the present case were not assessed using a validated patient-reported outcome measure, they should be regarded as supportive patient-centered observations rather than formal evidence of treatment effect.

Several limitations should be acknowledged. As a single case without a comparison group, the present report cannot establish comparative effectiveness or superiority of the omega-loop technique. Follow-up extending approximately 10 months for tooth 51 and 8 months for tooth 61 after reconstruction did not extend to physiologic exfoliation, and the absence of radiographic

examination at the latest follow-up limited assessment of root resorption and the developing permanent successors. In addition, improvements in toothbrushing behavior, biting comfort, and parental satisfaction were based on observation and parental report rather than validated outcome instruments. Finally, the favorable clinical outcome cannot be attributed solely to the omega-loop post because treatment comprised multiple components, including pulpectomy, coronal reconstruction, preventive counseling, fluoride application, and maintenance care. Within these limitations, the case demonstrates that an omega-loop post combined with a composite resin strip crown can provide a practical means of obtaining additional retention in a severely compromised primary anterior tooth when conventional adhesive retention is limited. Longer clinical and radiographic follow-up until physiologic exfoliation is required to evaluate restorative longevity, root resorption, and the health of the permanent successor.

CONCLUSION

In this 3-year-old with S-ECC, staged chairside treatment without general anesthesia, supported by behavioral guidance during each procedure, enabled pulpectomy and omega-loop-supported strip crown reconstruction of teeth 51 and 61. Both crowns remained clinically intact and retained at an interim review and at the latest follow-up, approximately 10 months after restoration of tooth 51 and 8 months after restoration of tooth 61, without clinically detectable mobility, local infection, or recurrent caries. These findings demonstrate clinical feasibility in this case, but not superiority over other posts; continued clinical and radiographic follow-up remains necessary.

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Author Contributions

All authors approved the final version of the manuscript. Moreover, the authors declare that no AI-assisted technologies used in the writing of this manuscript.

Conflict of Interest

The authors declare that they have no competing interests, both financial and non-financial, in relation to the subject of this study.

REFERENCES

1. American Academy of Pediatric Dentistry. Policy on early childhood caries (ECC): consequences and preventive strategies. The Reference Manual of Pediatric Dentistry. Chicago, IL: American Academy of Pediatric Dentistry; 2025. p. 96–100. Available from: https://www.aapd.org/research/oral-health-policies--recommendations/early-childhood-caries-classifications-consequences-and-preventive-strategies/
2. Uribe SE, Innes N, Maldupa I. The global prevalence of early childhood caries: a systematic review with meta-analysis using the WHO diagnostic criteria. Int J Paediatr Dent. 2021;31(6):817–30. Doi: https://doi.org/10.1111/ipd.12783
3. Maklennan A, Borg-Bartolo R, Wierichs RJ, Esteves-Oliveira M, Campus G. A systematic review and meta-analysis on early-childhood-caries global data. BMC Oral Health. 2024;24(1):835. Doi: https://doi.org/10.1186/s12903-024-04605-y
4. Hasan F, Yuliana LT, Budi HS, Ramasamy R, Ambiya ZI, Ghaisani AM. Prevalence of dental caries among children in Indonesia: a systematic review and meta-analysis of observational studies. Heliyon. 2024;10(11):e32102. Doi: https://doi.org/10.1016/j.heliyon.2024.e32102
5. Sofian MA, Setiawan AS, Hamdani AM, Pratidina NB, Suwargiani AA. Prevalence of early childhood caries (ECC) in children aged 2–6 years in the highlands and lowlands of West Java. Clin Cosmet Investig Dent. 2025;17:77–83. Doi: https://doi.org/10.2147/CCIDE.S467318
6. American Academy of Pediatric Dentistry. Pulp therapy for primary and immature permanent teeth. The

Reference Manual of Pediatric Dentistry. Chicago, IL: American Academy of Pediatric Dentistry; 2025. p. 487–96. Available from: https://www.aapd.org/research/oral-health-policies--recommendations/pulp-therapy-for-primary-and-immature-permanent-teeth/

7. Mittal N, Bhatia HP, Haider K. Methods of intracanal reinforcement in primary anterior teeth: assessing the outcomes through a systematic literature review. Int J Clin Pediatr Dent. 2015;8(1):48–54. Doi: https://doi.org/10.5005/jp-journals-10005-1282
8. Nilavarasan N, Hemalatha R, Vijayakumar R, Hariharan VS. Comparison of compressive strength among three different intracanal post materials in primary anterior teeth: an in vitro study. Eur J Dent. 2016;10(4):464–8. Doi: https://doi.org/10.4103/1305-7456.195181
9. Arora R, Raiyani CM, Singh V, Katageri AA. Postendodontic restoration of severely decayed primary tooth using modified omega loop as a post. J Nat Sci Biol Med. 2016;7(1):107–9. Doi: https://doi.org/10.4103/0976-9668.175107
10. Amend S, Boutsiouki C, Bekes K, Kloukos D, Gizani S, Lygidakis NN, et al. Clinical effectiveness of restorative materials for the restoration of carious lesions in pulp treated primary teeth: a systematic review. Eur Arch Paediatr Dent. 2022;23(5):761–76. Doi: https://doi.org/10.1007/s40368-022-00744-4
11. Oliveira RC, Garbim JR, Passaro AL, Tedesco TK, Raggio DP. Restorative strategies for deciduous anterior teeth: a systematic review and meta-analysis. Evid Based Dent. 2025;26(3):149. Doi: https://doi.org/10.1038/s41432-025-01144-5
12. Grewal N, Jha S, Kaur N. Clinical and radiographic success of resin-bonded strip crowns in primary incisors with varying extents of sound tooth structure available for bonding. Int J Clin Pediatr Dent. 2021;14(4):454–61. Doi: https://doi.org/10.5005/jp-journals-10005-1984
13. Martin AG, Shivashakarappa PG, Arumugam S, Sundaramurthy N. Posts in primary teeth-past to present: a review of literature. Int J Clin Pediatr Dent. 2021;14(5):705–10. Doi: https://doi.org/10.5005/jp-journals-10005-2034
14. Elheeny AAH, Sermani DI. Prefabricated zirconia crown versus resin-bonded composite strip crown in the restoration of primary incisors: a 36-month parallel randomized controlled trial. Pediatr Dent J. 2024;34(1):19–26. Doi: https://doi.org/10.1016/j.pdj.2023.12.004
15. Anil S, Anand PS. Early childhood caries: prevalence, risk factors, and prevention. Front Pediatr. 2017;5:157. Doi: https://doi.org/10.3389/fped.2017.00157
16. Tinanoff N, Baez RJ, Diaz Guillory C, Donly KJ, Feldens CA, McGrath C, et al. Early childhood caries epidemiology, aetiology, risk assessment, societal burden, management, education, and policy: global perspective. Int J Paediatr Dent. 2019;29(3):238–48. Doi: https://doi.org/10.1111/ipd.12484
17. Custódio NB, Schardosim LR, Piovesan CP, Hochscheidt L, Goettems ML. Maternal perception of the impact of anterior caries and its treatment on children: a qualitative study. Int J Paediatr Dent. 2019;29(5):642–9. Doi: https://doi.org/10.1111/ipd.12501