

Value-driven Endodontics: Pioneering a comprehensive Clinical Quality Index incorporating a root canal therapy standard outcome set arising from a Singapore tertiary dental institution

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Introduction

The global endodontics treatment burden is high, with around 50% of adults having had at least one root canal-treated tooth worldwide (Leon-Lopez *et al.*, IEJ 2022). Being the nation's largest subsidized tertiary dental institution, the endodontic unit in National Dental Centre Singapore (NDCS) performs around 5000 root canal therapies annually, with large variations in length of patients' treatment journey.

Value-driven care focuses on delivering best health outcomes per unit cost (Porter, NEJM 2010). To cope with the population's increasing need for endodontic care, as well as steward the use of the healthcare budget judiciously, a comprehensive Clinical Quality Index (CQI) looking at endodontic outcomes was built de-novo to incorporate (i) standard outcome set to incorporate international standards of quality of root canal treatment (ii) patient-reported outcomes (PRO) to measure oral health improvement and experiences and (iii) fundamental tenets of public health such as accessibility to care.

Methodology

Standard outcome Set

The standard outcome set was determined based on alignment with international specialty guidelines (Treatment Standards AAE 2020; ESE Quality Guidelines 2006), and consensus among all endodontists in the institution regarding significant treatment-related prognostic factors in the existing literature.

Patient-reported Outcomes (PRO)

The workgroup piloted the implementation of PRO questionnaires at various timepoints, using various platforms, as well as using different known oral health quality of life instruments. A 1-month post-treatment OHIP5 was selected based on the relevance and ease of conduct (thereby higher response rate) of the survey.

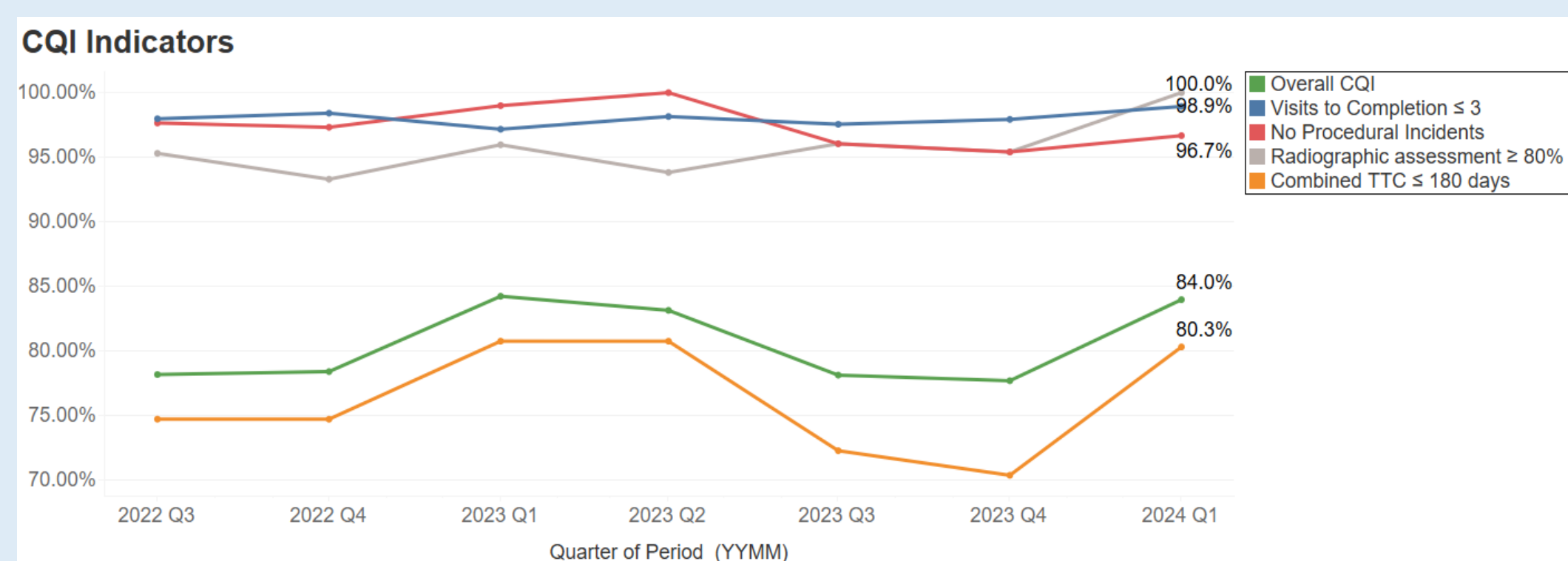
Access to Care

While a number of metrics have traditionally been reported to Ministry of Health, the time taken for endodontic patients to have completed their treatment was deemed to be relevant and important. The reasons were twofold- firstly, long wait times were of prime concern as revealed in various PRO channels during pilot stages and secondly, chronicity of disease and time to permanent restoration of endodontically treated teeth were reported to impact tooth survival/success (Ng *et al.*, IEJ 2023).

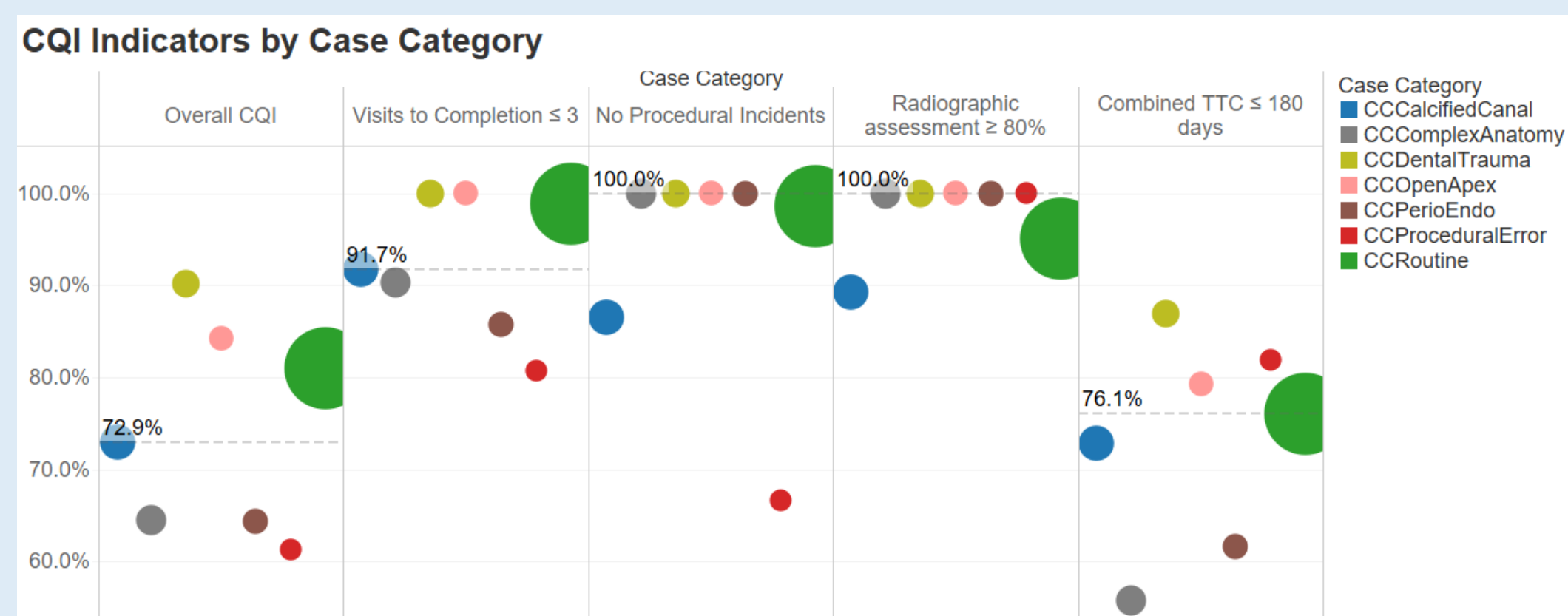
Endodontics Clinical Quality Index			Data Source
Access to care	Combined wait time to treatment and completion of root canal treatment ≤ 180 days		IT enabled
Standard Outcome Set	No. of Visits to Completion ≤ 3		IT enabled
	% Procedural Incidents		IT enabled/ Clinician-reported*
	Radiographic assessment ≥ 80%	Pre-operative radiograph of sufficient quality	Manual audit
		Adequate length and density of root canal obturation	
		Adequate final restoration	
Post-operative radiograph of sufficient quality			
Patient-reported outcomes	End of treatment PRO(utcome)M ≥ 70% with OHIP-5	Oral function	IT enabled on parallel platform
		Orofacial pain	
		Psychosocial impact	
		Orofacial appearance	
	PRE(xperience)M ≥ 70%		

Results

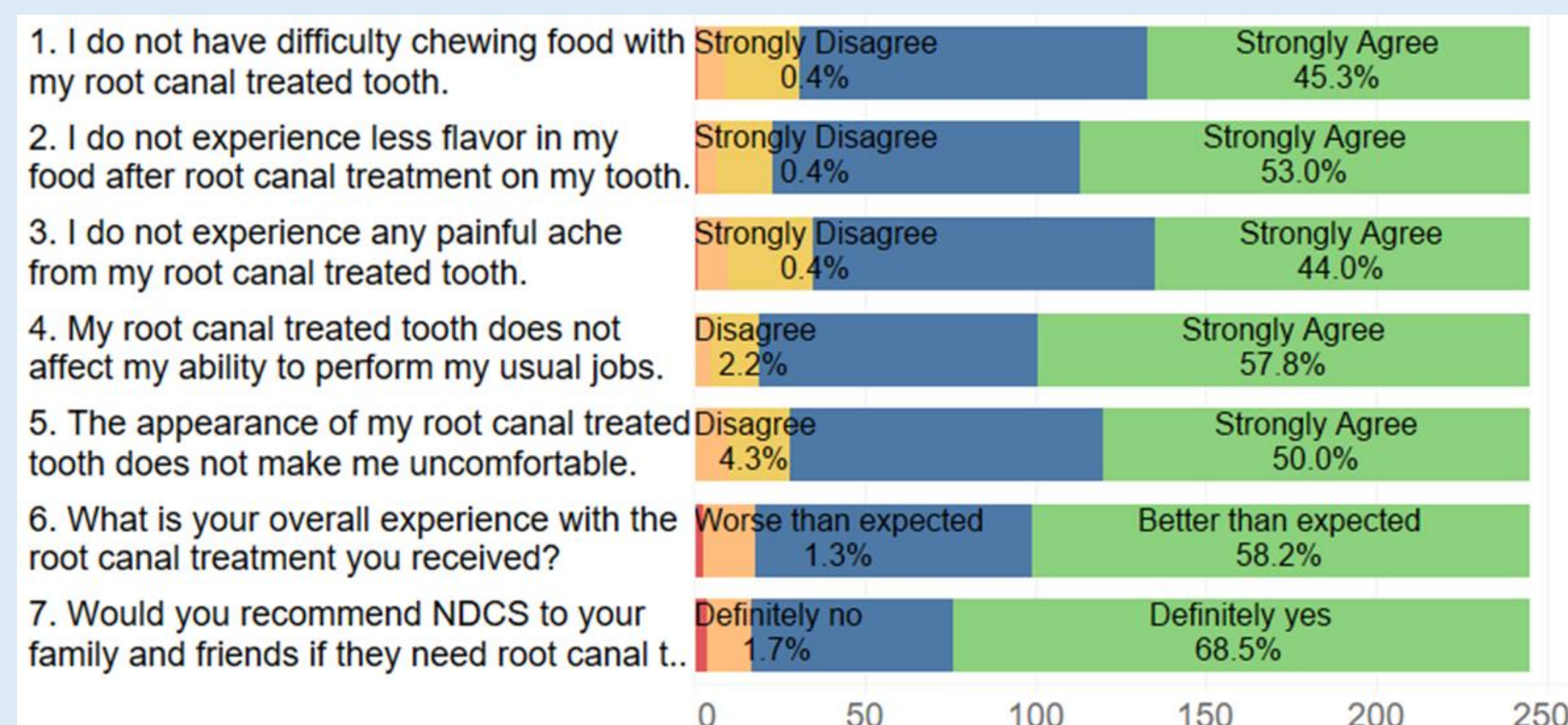
A high throughput dashboard, Tableau, was utilized to present the composite Clinical Quality Index. PRO were reported separately as it is currently under optimization prior to incorporation.



The figure below shows CQI parameters segmented by root canal case complexity (Case Category). While a large proportion of treatments were routine, a small but significant impact on CQI was seen in complex cases such as management of calcified teeth, teeth with procedural errors and teeth with periodontal complications arising from endodontic disease.



PRO outcomes were positive in all domains examined by OHIP-5, with pain and function being areas for further improvement.



Conclusion

The de-novo development of a tailored endodontics Clinical Quality Index (CQI) has granted real-time insights regarding the endodontics treatment delivery in our healthcare system. This CQI serves as a foundation for value comparisons across time and healthcare providers. Amassing the capabilities of the analytic platform, granular data could be used to identify areas for improvement, inform healthcare policies, manage clinician performance as well as aid in patient decision-making.