

A retrospective observational study of the management of non-traumatic dental presentations at a tertiary centre in New Zealand: a Choosing Wisely approach

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ABSTRACT

AIMS: Non-traumatic dental presentations (NTDPs) commonly present to emergency departments (EDs) and may receive orthopantomograms (OPGs, plain X-rays), opiates and antibiotics. “Choosing Wisely” is an international healthcare campaign that aims to reduce unnecessary and low-value patient care. This study aims to identify low-value management of NTDPs.

METHODS: Presentations to the Christchurch Hospital ED with dental pain or dental abscess in 2020 were included. Data collected included patient demographics, management and discharge medications. Descriptive statistics were calculated.

RESULTS: There were 931 NTDPs during the study period, with over-representation of young adults, Māori, Pacific Peoples and those living in high-deprivation areas. Of these, 343 (37%) received an OPG, of which 24% (83) were considered low value. Of patients managed by ED staff who were not referred to specialist dental services, 258 (42%) were prescribed antibiotics, of whom only half had facial swelling, and 71% received a script for analgesia, of which 78% included an opiate. Seventy-three percent of patients presented outside of normal working hours. Fewer than one in five NTDPs received definitive treatment.

CONCLUSIONS: NTDPs may receive non-optimal management in EDs. Continuing to care for NTDPs in this environment may add to increased healthcare costs, access block and poor opioid and antimicrobial stewardship.

Toothache, dental abscesses and other non-traumatic dental presentations (NTDPs) are a common presentation to emergency departments (EDs) in New Zealand.^{1,2} The lack of accessible and affordable primary dental care has been linked to the increased presentation of NTDPs to hospitals, locally and internationally, with ethnic minorities and the most financially deprived being over-represented.^{3,4} EDs are ill equipped to manage dental presentations without appropriate facilities, capacity and dentally trained staff. Low-acuity presentations contribute to burdens on EDs, hospital capacity and inpatient resources, and may impact on timely access to care for acute conditions.⁵

EDs may be an inappropriate environment for managing NTDPs, as non-dentally trained staff are unable to offer operative treatment. Extraction or pulp therapy is the most effective means of managing dental infection and tooth abscesses, yet are not routinely available at EDs.⁶ New Zealand ED staff feel frustrated and powerless because they are not trained to manage dental conditions, cannot offer definitive treatment and cannot direct

patients to affordable community options.² In an effort to diagnose and treat NTDPs, patients may undergo an orthopantomogram (OPG), a plain radiographic film, and be prescribed opioids and antibiotics.⁷ However, without operative intervention, patients with NTDPs are likely to cyclically reattend ED, receive unnecessary imaging, opioids or antibiotics, and receive non-optimal care.⁷

“Choosing Wisely” is an initiative launched to improve the stewardship of resource use, encouraging patients and clinicians to discuss the appropriateness of common interventions.⁸ The aim of this study is to assess whether we are “Choosing Wisely” by investigating the prevalence of unnecessary and low-value OPGs and the pharmacological prescribing habits for NTDPs.

Materials and methods

Study design

A retrospective observational study was conducted assessing NTDPs to the Christchurch Hospital ED from 1 January 2020 to 31 December 2020.

Setting

Christchurch Hospital is a tertiary-level hospital in Canterbury, New Zealand, that serves a population of approximately 580,000 people. The ED is the main acute referral centre in the region, with over 100,000 presentations annually.⁹ NTDPs are managed by ED staff, with acute referrals to the Oral and Maxillofacial Service (OMS) for patients with significant swelling or systemic concerns. Local guidelines instruct ED staff referring patients with a facial swelling to request an orthopantomogram (OPG, plain X-ray). Non-acute follow-up may be available to eligible low-income patients with a Community Services Card via referral to the outpatient hospital dental service.

Participants

Patients with arrival complaints or discharge diagnoses of “toothache”, “dental pain”, “facial swelling” or “dental abscess” were included. Patients were excluded if presentations were not related to NTDPs, patients left before being seen by a doctor or were missing documentation.

Data collection

Data were extracted from clinical notes from the Christchurch Hospital’s electronic medical record system. All data were de-identified on extraction by the research team. Ethnicity data were classified as NZ European/Other, Māori, Pacific Peoples and Asian. Deprivation levels are reported as per the New Zealand Index of Deprivation (NZDep), displayed as deciles 1–10, with decile 1 representing the least deprived.

Data analysis

Data underwent descriptive statistical analysis with RStudio (Version 1.2.5033). Continuous data were assessed for normality, with medians and interquartile ranges (IQR) reported and compared using non-parametric tests. Odds ratios (OR) and 95% confidence intervals (CIs) were used for count data or Fisher tests for any cross-tabulation with zero cases in it.

Ethics

This study was granted ethical approval by the University of Otago Human Research Ethics Committee (HD21/032). In addition, locality authorisation (RO#21110) and Māori health endorsement were sought (#220429).

Results

Over the 1-year period there were 100,039 presentations to Christchurch Hospital. Of the 1,083 patients with relevant arrival complaints or discharge diagnoses, 152 of these presentations were excluded (Figure 1). The total patients included were 931, which accounted for 0.93% of ED presentations in 2020.

Demographics

Table 1 shows the demographic characteristics of patients. Of the presenting cohort, 54% were male, with a median age of 31 years (IQR 25–41). Patients aged 25–34 had the highest incidence of presentation at 36%. Māori (27%) and Pacific Peoples (7.4%) were over-represented compared to New Zealand European/Other. The NZDep for this cohort was not normally distributed, with a median of 6 (IQR 4–8) and 49% of patients in categories 7–10.

Clinical features

Patients with NTDPs were documented to have swelling (extraoral and/or intraoral) in 41.2% (384/931) of cases (Table 2). Extraoral swelling was present in 33.4% of cases (331/931) and intraoral swelling in 21.8% (201/931). Trismus was documented in 7.4% (69/931) of cases and tachycardia in 5.7% (53/931). Documentation of airway concern and cervical lymphadenopathy were recorded but not included as these features were either rare or poorly documented. NTDPs were triaged according to the Australasian Triage Score (ATS) from 1 to 5, with 5 representing the least clinically concerning. Seventy-two percent of patients were triaged as category 4 or 5.

Timing of presentation

Timing of presentations is presented in Table 2. Seventy-three percent of patients presented outside of normal working hours (8 am–4 pm weekdays), combining both weekends (34%, 316/931) and after-hours weekdays (39%, 367/931).

Length of stay

ED length of stay (LOS) median time was 2.3 hours (IQR 1.4–3.2) (Table 3). Referral to specialty and/or OPG influenced ED LOS. Patients referred to a specialty and who had an OPG had the longest ED LOS (median 3.3 hours, IQR 2.5–4.6). Patients who had an OPG but were not referred to a

specialty spent a median 2.3 hours in ED (IQR 1.7–2.9). Patients who were not referred nor had an OPG had the shortest ED LOS (median 1.7 hours, IQR 1.1–2.5). For patients not referred to a specialty service, the addition of an OPG increased median ED LOS by 33 minutes ($p < 0.001$). For patients referred to a specialty, the addition of an OPG increased median ED LOS by 12 minutes but was not statistically significant ($p = 0.51$).

OPGs

Table 2 and 3 compare the characteristics and clinical management of patients who received OPGs with those who did not. OPGs were requested for 37% (343/931) of patients, with 75% (260/343) of them reviewed by a specialty. Twenty-four percent of patients who had an OPG requested

by ED staff did not receive a specialty referral or intervention and were considered low value.

Patients who had an OPG were more likely to be referred to a specialty, receive surgical intervention and be admitted. This is likely because the local ED pathway requires OPGs prior to OMS referral, thus these patients were less likely to be discharged by ED staff and receive a dental block or a prescription.

Eighty-five patients (9.2%) were referred for specialty referral without an OPG. Among those who were referred to OMS, 69 were ED referrals, 12 were direct referrals from the community and three were reviewed by OMS with advice given prior to ED-led discharge. One patient was referred to general medicine for paracetamol overdose.

Figure 1: Flowchart of study design and inclusion/exclusion of patients.

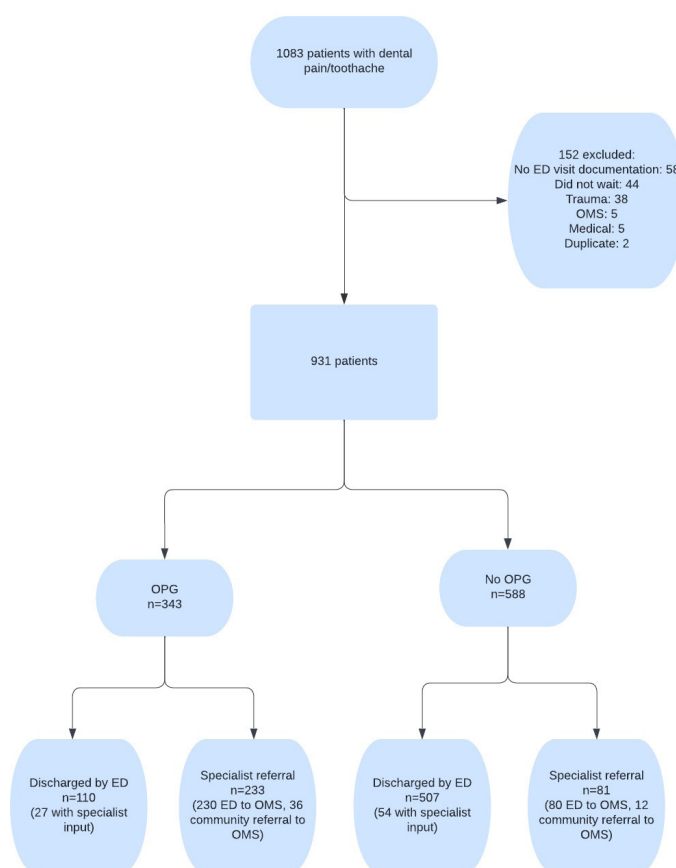


Table 1: Demographic characteristics of patients.

Patient characteristics	Number of patients n (%)	Canterbury 2020/2021 population projection*
Age		
0–19	52 (5.6%)	24.2%
20–24	170 (18.3%)	7.00%
25–34	338 (36.3%)	14.7%
35–44	164 (17.6%)	12.6%
45–54	116 (12.5%)	13.1%
55–64	65 (7.0%)	12.2%
65+	26 (2.8%)	16.2%
Gender		
Male	507 (54.5%)	50.2%
Ethnicity		
New Zealand European/Other	570 (61.2%)	74.3%
Māori	252 (27.1%)	9.8%
Pacific Peoples	69 (7.4%)	2.8%
Asian	40 (4.3%)	13.1%
NZDep*		2018 Census**
1–5	384 (31.3%)	60.4%
6–10	546 (58.7%)	39.6%

* Does not equal total as one patient was international.

** Population projections prepared by StatsNZ¹⁰ and NZ Deprivation data by University of Otago.¹¹

Where patients were referred directly to OMS without an OPG, the OPG machine was documented to be under service in five cases, and five received a computed tomography (CT) scan rather than OPG. Of the remaining 59 patients, 29 received surgical intervention without an OPG, and the rest were reviewed only. Five patients had surgical intervention under general anaesthetic without an OPG; three were children and two had a CT scan prior.

Incidental findings were reported in 14 OPGs (4%), with most related to sinus mucosal thickening, which OPGs are poor to assess.¹² Three reports indicated possible dentigerous cysts.

Specialty management

Forty-two percent of patients (395/931) were referred to a specialty (of these, 20% were for advice only). Forty-one percent (162/395) of referrals were managed conservatively (non-surgical management and discharge). Surgical intervention was offered to 59% (232/395) of patients (Table 3).

Admission

Of the 931 patients, 4% (39) were admitted to the hospital, with 36 being admitted under OMS and three under general medicine. Among those admitted

Table 2: Patient characteristics—OPG vs non-OPG.

	OPG n (%)	Non-OPG n (%)	Odds ratio
Number of patients	343	588	
Clinical features reported in ED*			
Extraoral swelling present	192	119	5.0 (3.7–6.7)
Intraoral swelling present	98	105	1.8 (1.3–2.5)
Trismus present	45	24	3.5 (2.1–5.9)
Tachycardic at presentation	36	17	3.9 (2.2–7.1)
Swelling (extraoral and/or intraoral) present	208	176	3.6 (2.7–4.8)
Gender			
Male	190 (55)	317 (54)	1.1 (0.8–1.4)
Ethnicity			
European	203 (59)	347(59)	1 (ref)
Māori	94 (27)	158 (27)	1.0 (0.7–1.4)
Pacific Peoples	28 (8)	41 (7)	1.2 (0.7–1.9)
Asian	15 (4)	25(4)	1.0 (0.5–2.0)
Middle Eastern/Latin American/African/Other	3 (<1)	17 (3)	0.3 (0.1–1.0)
NZDep**			
1–5	142	242	1.0 (0.8–1.3)
6–10	201	345	1.0 (0.8–1.3)
Timing of presentation			
During working hours (8 am–4 pm)	112 (33)	136 (23)	1.3 (0.9–1.8)
Weekday after hours (4 pm–8 am)	106 (31)	261 (44)	0.6 (0.5–0.9)
Weekend	125 (36)	191 (33)	1 (ref)
After hours (weekday 4 pm–8 am and weekend)	231 (67)	452 (77)	0.6 (0.5–0.8)

* Where values do not equal total, data points were “not documented”.

** Does not equal total as one patient was international.

Table 3: Clinician management—OPG vs non-OPG.

	OPG n (%)	Non-OPG n (%)	Statistics [®]
Number of patients	343	588	
ED management			
ED, no specialty input	83 (24.2)	453 (77.0)	1 (ref)
Specialty referral, seen at presentation [⊙]	232 (67.6)	85 (14.5)	14.9 (10.6–21.0)
Specialty referral, not seen at presentation	28 (8.2)	50 (8.5)	3.1 (1.8–5.1)
Median ED length of stay (hours)			
No specialty referral	2.25 (IQR 1.7–2.9)	1.66 (IQR 1.1–2.5)	p-value=<0.001
Specialty referral	3.25 (IQR 2.5–4.6)	3.05 (IQR 2.6–4.2)	p-value=0.51
ED prescribing*			
Discharged no Rx	19 (5)	101 (17)	0.3 (0.2–0.5)
Discharged with Rx	91 (27)	406 (69)	0.2 (0.1–0.2)
Discharged Rx including analgesia	76 (22)	365 (62)	0.2 (0.1–0.2)
Includes opioid	60 (18)	274 (47)	0.2 (0.2–0.3)
Discharged Rx including antibiotics	66 (19)	192 (33)	0.5 (0.4–0.7)
Augmentin	55 (16)	132 (22)	0.7 (0.5–0.9)
Amoxicillin	9 (3)	40 (7)	0.4 (0.2–0.8)
Other	2 (<1)	20 (3)	0.2 (<0.1–0.7)
Swelling (extraoral and/or intraoral) present	37 (11)	95 (16)	0.6 (0.4–0.9)
LA administered	7 (2)	39 (7)	0.3 (0.1–0.7)
Acute management†			
Conservative management ED	83 (24)	453 (77)	1 (ref)
Conservative management specialty	71 (21)	91 (15)	4.3 (2.9–6.3)
ED I&D LA	37 (11)	16 (3)	12.6 (6.7–23.7)
ED Exo LA	127 (37)	23 (4)	30.1 (18.2–49.8)
Extraction/I&D GA	24 (7)	5 (<1)	26.2 (9.7–70.6)
Admission/discharge[□]			
Admitted	29 (9)	10 (2)	5.3 (2.6–11.1)
Discharged	313 (91)	578 (98)	1 (ref)
Admission ward (specialty, OMS)	21	8	13.4 (5.8–31.1)

Table 3 (continued): Clinician management—OPG vs non-OPG.

Admission ward (specialty, other)	2	1	10.2 (0.9–113.6)
Admission HDU/ICU (OMS only)	6	1	30.6 (3.6–257.0)
Discharged by ED with f/u community	93	474	1 (ref)
Discharged by ED with f/u OMS	17	33	2.6 (1.4–4.9)
Discharged by OMS with f/u specialty	69	23	15.3 (9.1–25.8)
Discharged by OMS with f/u community	131	48	13.9 (9.3–20.7)
Self-discharged	3	0	p-value=0.005

●All values refer to odds ratio with confidence intervals in parenthesis unless specified, apart from Median ED length of stay (hours), which is a Mann–Whitney U test, and Admission/discharge: self-discharged, which is a Fisher test.

*Specialty referral includes patients referred to the Oral and Maxillofacial service (OMS); however, it also includes <5 patients referred to other specialties. An example is a patient referred to General Medicine with dental pain and diabetic ketoacidosis.

†Includes three patients reviewed by OMS but discharged by ED.

Rx refers to the prescription given to a patient on discharge.

□OPG acute management and admission/discharge does not equal total as one patient's management was not documented.

under OMS, 75% (27) required dental extraction and/or associated incision and drainage performed under general anaesthetic and 26% (7) required monitoring in a high dependency or intensive care unit after the procedure.

Discharge

Of 931 patients, 746 (80%) were directly discharged to the community, with 567 (76%) discharged by ED staff and 179 (24%) by the OMS team. Approximately 15% (142/931) had out-patient follow-up arranged with either OMS or hospital dental services.

ED management and prescribing on discharge

ED staff managed 66% (614/931) of NTDPs. Of these, 7.5% (46/614) received long-acting local anaesthetic. A total of 617 patients were discharged by ED, of which 81% (497/617) received a prescription, with analgesia being the most prescribed medication in 89% (441/497) of prescriptions. Of these, 78% (334/441) included some form of opioid, most commonly codeine (81% 270/334), followed by tramadol (17% 57/334) and morphine (2% 8/334). For 11 patients, prescriptions were not documented but their notes mentioned some form of take-home analgesia or

written prescription.

Antibiotics were prescribed in 52% (258/497) of cases with amoxicillin/clavulanic acid being the most prescribed (72%, 187/258), followed by amoxicillin (19%, 49/258) and various others (7%, 20/258 including cephalosporins, tetracyclines, aminoglycosides, sulfonamides, macrolides and nitroimidazoles). Of the 258 patients prescribed antibiotics on discharge, 49% (126) did not have documented extraoral or intraoral swelling.

Racial inequity

Māori were over-represented in NTDPs, accounting for 27% of all presentations in comparison to a regional population projection of 9.8%.¹⁰ Māori patients were younger and more deprived than non-Māori, with a median age of 28 and NZDep of 7 (Table 4). They were more likely to present with clinical features of intraoral swelling and trismus; however, there was no association with extraoral swelling or tachycardia. Māori patients were more likely to present during working hours (OR 1.6 [1.1–2.4 95% CI]), but there were no statistically significant differences in ED LOS, specialty referral, management or admission and discharge between Māori and non-Māori patients. Māori were less likely to be prescribed “Other” antibiotics (OR 0.2 [0.1–0.9])

Table 4: Patient characteristics and clinical management—Māori vs non-Māori.

	Māori n (%)	Non-Māori n (%)	Statistics [®]	Statistics controlling for age
Number of patients	252	679		N/A
Patient characteristics				
Male	134 (53)	373 (55)	0.9 (0.7–1.2)	1.0 (0.8–1.4)
Age (median)	28	32	p-value=<0.001	N/A
NZDep (median)	7	6	p-value=0.01	p=0.04
Clinical features reported in ED*				
Extraoral swelling present	92	219	1.2 (0.9–1.6)	1.3 (0.9–1.8)
Intraoral swelling present	68	135	1.5 (1.1–2.1)	1.5 (1.1–2.1)
Trismus present	27	42	1.8 (1.1–3.0)	1.7 (1.0–2.9)
Tachycardic at presentation	12	41	0.8 (0.4–1.5)	0.7 (0.3–1.3)
Timing of presentation				
During working hours (8 am–4 pm)	82 (33)	166 (24)	1.6 (1.1–2.4)	1.7 (1.1–2.6)
Weekday after hours (4 pm–8 am)	97 (39)	270 (40)	1.2 (0.8–1.7)	1.1 (0.7–1.7)
Weekend	73 (29)	243 (36)	1 (ref)	1 (ref)
Total after hours	170 (67)	513 (76)	0.7 (0.5–0.9)	0.6 (0.4–0.8)
ED management†				
ED, no specialty input	144 (57)	392 (58)	1 (ref)	1 (ref)
Specialty referral, seen at presentation	86 (34)	231 (34)	1.0 (0.7–1.4)	1.1 (0.8–1.6)
Specialty referral, not seen at presentation	22 (9)	56 (8)	1.1 (0.6–1.8)	1.2 (0.7–2.0)
OPG	94 (37)	249 (36)	1.0 (0.8–1.4)	1.2 (0.9–1.6)
Median ED length of stay (hours)				
No specialty referral	1.85 (IQR=1.1–2.7)	1.73 (IQR=1.1–2.5)	p-value=0.79	p=0.49
Specialty referral	3.22 (IQR=2.8–4.7)	3.13 (IQR=2.5–4.4)	p-value=0.45	p=0.1
No OPG	1.87 (IQR=1.1–3.0)	1.76 (IQR=1.2–2.7)	p-value=0.54	p=0.85

Table 4 (continued): Patient characteristics and clinical management—Māori vs non-Māori.

OPG	3.18 (IQR=2.2–3.6)	2.95 (IQR=2.1–4.0)	p-value=0.89	p=0.38
Specialty referral + OPG	3.22 (IQR=2.7–4.8)	3.25 (IQR=2.5–4.6)	p-value=0.76	p=0.12
No specialty referral + no OPG	1.67 (IQR=1.1–2.6)	1.66 (IQR=1.1–2.5)	p-value=0.83	p=0.42
ED prescribing □				
Discharged no Rx	31 (12.3)	89 (13.1)	0.9 (0.6–1.4)	0.8 (0.5–1.3)
Discharged with Rx	136 (54.0)	361 (53.2)	1.0 (0.8–1.4)	1.0 (0.7–1.3)
Discharged Rx including analgesia	126 (50.0)	315 (46.3)	0.9 (0.7–1.2)	1.0 (0.8–1.4)
Includes opioid	97 (38.5)	237 (35.0)	1.2 (0.9–1.6)	1.1 (0.8–1.5)
Discharged Rx including antibiotics	70 (27.8)	188 (27.7)	1.0 (0.7–1.4)	1.0 (0.7–1.4)
Augmentin	54 (21.4)	133 (19.6)	1.1 (0.8–1.6)	1.1 (0.8–1.6)
Amoxicillin	14 (5.6)	35 (5.2)	1.1 (0.6–2.0)	1.1 (0.6–2.1)
Other	2 (<1)	20 (2.9)	0.3 (0.1–0.9)	0.2 (0.1–0.9)
LA	16 (4.7)	30 (5.1)	1.5 (0.8–2.7)	1.4 (0.7–2.6)
Acute management §				
Conservative management ED	144 (57.1)	392 (57.8)	1 (ref)	1 (ref)
Conservative management specialty	42 (16.7)	120 (17.7)	1.0 (0.6–1.4)	1.0 (0.7–1.5)
ED I&D LA	11 (4.4)	42 (6.2)	0.7 (0.4–1.4)	0.8 (0.4–1.5)
ED Exo LA	45 (17.9)	105 (15.5)	1.2 (0.8–1.7)	1.4 (1.0–2.2)
Extraction/I&D GA	10 (4.0)	19 (2.8)	1.4 (0.7–3.2)	1.3 (0.6–2.9)
Admission/discharge §				
Admitted	13 (5.2)	26 (3.8)	1.4 (0.7–2.7)	1.3 (0.6–2.6)
Discharged	239 (94.8)	652 (96.0)	1 (ref)	1 (ref)
Admission ward (specialty, OMS)	12	17	2.0 (0.9–4.3)	2.0 (0.9–4.4)
Admission ward (specialty, other)	1	2	1.4 (0.1–15.9)	1.7 (0.1–19.1)
Admission HDU/ICU (OMS only)	0	7	p=0.2 (Fisher test)	N/A
Discharged by ED with f/u community	147	420	1 (ref)	1 (ref)

Table 4 (continued): Patient characteristics and clinical management—Māori vs non-Māori.

Discharged by ED with f/u OMS	19	31	1.8 (1.0–3.2)	1.9 (1.0–3.6)
Discharged by OMS with f/u specialty	26	66	1.1 (0.7–1.8)	1.3 (0.8–2.1)
Discharged by OMS with f/u community	47	132	1.0 (0.7–1.5)	N/A
Self-discharged	0	3	p=0.6 (Fisher test)	

●All values refer to odds ratio with confidence intervals in parenthesis unless specified, apart from Median ED length of stay (hours), which is a Mann–Whitney U test, and Admission/discharge: self-discharged, which is a Fisher test.

*Where values do not equal total, data points were “not documented”.

†Specialty referral includes patients referred to the Oral and Maxillofacial service (OMS); however, it also includes <5 patients referred to other specialties.

□Includes three patients reviewed by OMS, but discharged by ED.

§Non-Māori acute management and Admission/discharge does not equal total as one patient’s management was not documented.

Rx refers to the prescription given to a patient on discharge.

N/A = not applicable.

Discussion

The “Choosing Wisely” campaign is a global initiative aimed at promoting responsible use of healthcare resources.⁸ This study investigated the management of NTDPs in a large tertiary ED in New Zealand, including the utilisation of OPGs and prescription of opioids and antibiotics.

The study’s demographics of NTDPs align with previous research, showing over-representation among young adults, Māori, Pacific Peoples and those living in high deprivation areas.^{1,2} These findings have not changed since they were reported in the New Zealand Oral Health Survey a decade ago.⁴ A recent audit at Christchurch Hospital found that referral rates to OMS services had doubled from 2018–2020, with higher rates for Māori and Pacific Peoples.¹³ When compared to referral rates of a similar 2008–2009 study, this suggests a worsening of oral health inequity for Māori in this region.¹⁴

Most NTDPs were low severity and managed by non-dentally trained ED staff. This is reflected in the high rates of discharge to the community (80%), and low rates of treatment under general anaesthesia (3%) or admission to hospital (4%). Cost and access to private dental care have been suggested as reasons for NTDPs presenting to the ED, rather than severity.⁴ NTDPs are largely preventable through appropriate preventive and community dental care, and their presentation in

EDs represents failures in primary dental care.³ The consequences of low-acuity presentations cannot be underestimated, as NTDPs account for up to 1% of all ED presentations in some New Zealand hospitals, placing significant burden on an already overstrained healthcare system.^{1,15}

Although there is limited literature on the use of radiological investigations for NTDPs in the ED setting, the authors suggest that OPGs be considered only when significant facial swelling or systemic signs necessitate surgical intervention. For the clinically stable patients, OPGs are unlikely to provide additional value, as most patients receive palliative symptom management. Unnecessary OPGs contribute to prolonged ED LOS, access block and radiation exposure.⁵ In our study, we identified that 24% of OPG requests were not aligned with specialist referrals and were likely of low value. The reasons behind OPG requests in the ED were not evaluated, but they may aim to enhance patient flow and facilitate specialist referrals.¹⁶ Additionally, some patients underwent surgical intervention without an OPG, raising questions about the necessity or prior availability of imaging. This highlights the need to consider whether ED staff should request OPGs for all NTDPs referred to OMS.

Our study investigated opioid and antibiotic prescribing for NTDPs in EDs. Among patients managed by ED, 54% (334/617) were prescribed opioids for pain relief with codeine being the most common despite its modest efficacy in managing acute dental pain and potential for

adverse effects.^{17,18} A 2018 overview of 5 systematic reviews suggests combinations of ibuprofen and paracetamol are more effective than any opioid and produce lower incidence of adverse events and potential for abuse.^{17–20} Furthermore, opioid prescribing in the ED may contribute to long-term use and addiction, which is particularly concerning given the potential for NTDPs to cyclically reattend.^{21,22}

To mitigate opioid prescribing for NTDPs, implementing workflow solutions such as utilising long-acting local anaesthetic can be effective.^{17,21} Dental nerve blocks, when included in prescribing guidelines, have been shown to reduce opioid prescription rates.²³ However, despite 7% of patients receiving dental blocks in this study, 57% were still prescribed opioids upon discharge. Although the study did not examine the administration pattern of dental blocks, inadequate training and patient acceptance could be barriers to ED staff performing them.²¹

Antibiotics being prescribed for acute dental conditions has come under greater scrutiny among concerns of increasing antibiotic resistance.²² A recent systematic review by the American Dental Association emphasises the importance of prioritising definite dental treatment for patients with NTDPs and avoiding antibiotic prescriptions for those without localised or systemic features. Delayed prescriptions for amoxicillin or penicillin V are recommended for patients with a localised abscess but no immediate access to definitive treatment. In an ED setting, physicians should assess patients' access to oral healthcare and determine the necessity of immediate antibiotic prescriptions. If definitive treatment is available for patients with localised abscess, antibiotics are not recommended. For cases with systemic involvement, antibiotics and urgent referral for definitive treatment are advised.²⁴ These guidelines highlight that where access to definitive treatment is available, unnecessary antibiotic prescribing can be prevented.

The review also highlights that narrow-spectrum antibiotics (amoxicillin) are effective for managing dental swellings, whereas broad-spectrum antibiotics (amoxicillin/clavulanic acid) are unnecessary unless the infection is severe or initial treatment has failed.^{24,25} However, in our study, 258 out of 617 (42%) patients managed by ED were prescribed antibiotics, with only half of them having facial swelling. Surprisingly, amoxicillin/clavulanic acid was the most prescribed antibiotic (74%), yet only 47% of this group had documented

swelling. This over-reliance on broad-spectrum antibiotics at our centre is concerning, as it contradicts the current guidelines for NTDPs and differs from international prescribing habits.²² The observed disparities may stem from insufficient training in dental condition management and a tendency to take action when feeling powerless.^{2,26} Over-prescribing opioids and antibiotics for NTDPs without access to definitive treatment can perpetuate cyclic reattendance and is inconsistent with principles of antimicrobial stewardship and Choosing Wisely.⁸ Addressing these issues is crucial for promoting appropriate prescribing practices and improving patient outcomes.

The financial implications of managing NTDPs in the ED are significant. In New Zealand, eligibility for care of dental conditions is determined not only by the severity of the presenting condition but also by an individual's income threshold and possession of a Community Services Card.² In 2018, the cost of a visit to a New Zealand ED was estimated to be NZ \$370.²⁷ Therefore, in 2020, Christchurch ED likely incurred a minimum cost of \$344,470 for NTDP management, which primarily provided symptomatic relief. When considering operative treatment as the appropriate intervention, fewer than one in five NTDPs received definitive treatment. In contrast, a simple extraction in a private dental practice in Canterbury averages \$233.²⁸ Allocating public funds to provide temporary symptomatic relief in this manner is ineffective and may contribute to cyclic reattendance.

Our study emphasises that the ED environment is not optimal for managing NTDPs and failings in primary healthcare services must be addressed to enable routine and urgent dental care. On a background of calls for increasing targeted or universally funded dental care, a policy report in 2019 estimated that providing basic dental services for low-income adults in New Zealand would generate a return of \$1.60 for each dollar invested, due to reduced health services costs, increased employment and tax revenue.²⁹ Reorienting oral health services to establish community-based relief-of-pain services or contracting private dentists to provide affordable and after-hours dental care to low-income individuals could provide viable referral avenues for NTDPs presenting to EDs and reduce inappropriate antibiotic and opioid prescribing.² Without significant change, socially and economically disadvantaged individuals will continue to have limited access to primary dental care and rely on ill-equipped EDs for care.

Strengths and limitations

To our knowledge, this is the first investigation into the management and prescribing habits of ED staff for NTDPs in New Zealand hospitals. However, limitations of this study include potential variability in the management of NTDPs across New Zealand hospitals due to differences in demographics and resource distribution. Furthermore, this hospital serves a large population that lacks community water fluoridation, which is known to provide the most benefit to disadvantaged socio-economic groups.³⁰ Additionally, the retrospective nature of the study relies on the accuracy and completeness of clinical documentation.

The observational study also covered periods of enforced public lockdown due to COVID-19, which may have affected management, presentation patterns and referral rates. Referral rates to OMS

during the lockdown period of 2020 were found to be lower when compared to the year previous; however, rates of referral to OMS services for the entire year were still increased compared to the year prior.¹³

Conclusion

This observational study examined the management of patients presenting with NTDPs to an ED in New Zealand. Most NTDPs were low severity and managed by non-dentally trained ED staff. NTDPs may receive non-optimal care in this environment, which may contribute to increased healthcare costs, access block for time-critical patients, unnecessary radiation exposure and poor opioid and antimicrobial stewardship.

COMPETING INTERESTS

Nil.

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