

# Optimal proportion of different patterns of dental extraction forceps for use in Tanzania: A guide for equipping dental clinics

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## Abstract

The aim of this study was to determine the proportion of different extraction forceps required for optimal provision of dental services in clinics in Mainland Tanzania, so as to provide the basis for purchasing dental forceps. Data on the different teeth extracted in Mainland Tanzania was collected during the period of August/September 1992 by special forms mailed to eighteen regional clinics known to have dental officers and to all the four clinics in Dar es Salaam City. Dentists were requested in accompanying letters to record all teeth extracted during working days of the month. Data processing was done by allocating teeth in groups which are usually extracted using the same forceps. A total of 9,881 teeth of the secondary dentition and 1,762 of primary dentition were extracted in 22 clinics during the study period. The ratio of teeth extracted was 1:2:2:2:4:5:18 for lower anteriors, upper anteriors, lower premolars; upper premolars; upper right molars, upper left molars and lower molars, respectively for secondary dentition and 1:1:2:2:6 for upper right molars, upper left molars, upper anteriors, lower anteriors, lower molars for the primary dentition, respectively. The mean number of primary and secondary teeth extract per clinic per day were <8 and <34, respectively. It is concluded that 34 forceps for secondary dentition and 7 for primary dentition, both in the calculated ratios, should comprise the 'ideal' set for use in Tanzania.

## Introduction

Data on the demand for oral health services in Tanzania show that over 80% of dental patients seek dental treatment because of pain (2,3). Treatment for such pain usually is tooth extraction, which accounts for 81.5% of oral health care provided in Tanzania (4). Brochure from suppliers of dental instruments show varieties of instruments including 'ideal' sets of extraction forceps for complete coverage of the mouth, comprising of nine patterns, all of which sell at the same price per unit (5). In populations where dental caries severity is very high, all types of teeth may be lost at relatively the same rate, and therefore the 'ideal' set advocated in brochures become effectively used. But in countries like Tanzania, where dental caries severity is low, and therefore lesions are mainly in molars and premolars, the rate of toothloss differ significantly between different tooth types (6,7,8). This necessitates an estimation of a more practical set for extraction forceps.

Knowledge on instruments and materials actually required for the day to day running of dental clinics in Tanzania is limited. This deficiency has lead decision makers to purchase dental extraction forceps equal number of frequently and infrequently used forceps, leading into wastage of limited resources.

The aim of this study was to determine the relative requirement of different forceps needed for the optimal provision of extraction services in dental clinics in Tanzania.

## Materials and methods

Special forms for recording types of teeth extracted were sent to 22 dental clinics in 17 regions known to have a dental officer in Tanzania mainland. Two regional dental clinics with no dental officers were excluded from the study to ensure uniformity and reliability of the collected data. Clinicians were requested in accompanying letters to record all teeth extracted during working days of the month. All clinics returned the filled forms. Data processing was done by allocating teeth in groups which are usually extracted using the same forceps. The frequency at which each group of teeth was extracted per day represents the magnitude at which each forceps would be required in clinics.

## Results

A total of 9,881 teeth of secondary dentition and 1,762 teeth of primary dentition were extracted in 22 dental clinics studied in a period of one month. The mean numbers of teeth extracted per day per clinic is shown in Table 2. Apart from large mean number of 17 and 67 for primary and secondary teeth extracted in clinic number 4, other clinics had mean numbers equal or less than 5 and 30 extractions per day for primary and secondary teeth, respectively. The most frequent group of teeth extracted were lower molars (54.2%) and 47.7% of the secondary and primary dentition respectively. The group frequencies of the teeth

extracted in secondary dentition was 1:2:2:2:4:5:18 for lower anteriors, upper anteriors, lower premolars, upper premolars, upper right molars, upper left molars, lower molars respectively. For the primary dentition the ratio was 1:1:2:2:6 for upper right molars, upper left molars, upper anteriors: lower anteriors, lower molars respectively Table 1. Roots for molar teeth accounted for up to 96.6% of all root extractions in the secondary dentition. The ratio of primary root groups was 1:2:3 for Upper Molar roots, Upper Anterior roots, and Lower roots, respectively. In the secondary dentition, root groups extracted were in the ratio 1:12:16 for Upper Anterior Roots, Upper Molar Roots, Lower Roots (Table 3). Except for clinic number 20 with a mean of 5, all the clinics had a mean of less than one.

### Discussion

In this study, the mean number of extractions of

permanent teeth per working day is 30 or less. As shown in the results section the ratio of the extracted teeth was 1:2:2:2:4:5:18 for lower anteriors:upper anteriors: lower premolars: upper premolars: upper right molars: upper left molars: lower molars, respectively.

This implies that if dental clinics in Tanzania were to be equipped with either 34 or 17 in the above mentioned ratios; one forceps will be used once or twice in a day, respectively. In case of primary dentition, the ratio of extracted teeth was 1:1:2:2:6 for the upper right molars: upper left molars: lower anteriors: lower molars, respectively. This gives a minimum number of 12 junior forceps. Since the mean number of primary teeth extracted per working day was less than 8, a junior set consisting of 3 lower molar forceps and one for each of the other types would suffice. The mean number of roots extracted for both dentitions was less than one per day, implying that a clinic can

**Table 1: Distribution of Primary and Secondary Teeth Extracted in Maitland Tanzania in a period of one month**

Group	Dentition	Total teeth extracted	Percent of all teeth extracted	Ratio
Upper Right Molars	1°	153	8.7	1.0(1)
	2°	1,274	12.9	4.2(4)
Upper Premolars	1°	-	-	-
	2°	599	6.1	2.0(2)
Upper Anteriors	1°	337	19.1	2.2(2)
	2°	462	4.7	1.5(2)
Upper Left Molars	1°	174	9.9	1.1(1)
	2°	1,398	14.1	4.6(5)
Lower Molars	1°	880	47.7	5.5 (6)
	2°	5,398	54.2	17.7(18)
Lower Premolars	1°	-	-	-
	2°	488	4.9	1.6(2)
Lower Anteriors	1°	258	14.6	1.7(2)
	2°	302	3.1	1.0(1)
TOTAL	1°	1,762	100.0	(12)
	2°	9,881	100.0	(34)

Key: 1° = Primary dentition; 2° = Secondary dentition; number in ( ) = ratio to the nearest whole number.

**Table 2: Mean number of Primary and Secondary teeth extracted per day per clinic**

Clinic	1	2	3	4	5	6	7	8	9	10	11
Mean 1°	2	3	3	17	1	5	1	4	5	1	2
Mean 2°	12	14	11	67	3	21	5	24	21	3	24
Clinic	12	13	14	15	16	17	18	19	20	21	22
Mean 1°	2	3	8	4	4	3	2	2	3	3	5
Mean 2°	10	19	30	28	16	15	23	14	23	12	24

Key: 1° = Primary teeth; 2° = Secondary teeth.

**Table 3: Distribution of groups of roots for primary and secondary teeth extracted in Mainland Tanzania in a period of one month**

Group	Dentition	Total roots extracted	percent teeth extracted	Ratio
Upper roots (posterior)	1°	1	16.7	1.0(1)
	2°	36	41.9	12.0(12)
Upper roots (anteriors)	1°	2	33.3	2.0(2)
	2°	3	3.5	1.0(1)
Lower roots	1°	3	50.0	3.0(3)
	2°	47	54.7	15.7(16)
Total	1°	6	100.0	(6)
	2°	86	100.0	(29)

Key: 1° = Primary dentition; 2° = Secondary dentition; number in ( ) = ratio to the nearest whole number.

function well with only two forceps, one for each dentition.

Most dental patients visit clinics very early in the morning due to severe toothache<sup>2</sup>. It is therefore possible for the dental auxiliary to arrange patients in a manner that will clear up patient queue as quickly as possible and minimize sterilization episodes.

### Conclusion

It can be concluded from the findings of this study that 34 forceps for the permanent teeth, 7 for the primary dentition and 2 root forceps in the ratios outlined above should comprise the 'ideal' set for the optimal provision of extraction services in Tanzanian dental clinics. However, smaller numbers

of forceps can be purchased provided the above calculated ratio is taken into consideration.

### References

1. Feldstein Paul J. Health Care Economics, 2nd ed. John Wiley and Sons; Wiley Medical Publications 1983:248.
2. Van Palensteln Helderman WH, Nathoo ZAW. Dental Treatment demands among patients in Tanzania. Community Dent Oral Epidemiol 1990; 18: 85-7.
3. Mosha HJ, Scheutz F. Perceived need and use of oral health services among adolescents and adults in Tanzania. Community Dent Oral Epidemiol 1993; 21:129-32.

4. Central Oral Health Unit. The National Plan for Oral Health 1988-2002, 1st revision. Ministry of Health, The United Republic of Tanzania 1994; 54.
5. Dentsply/Export Division. Surgery Products. Dentsply Dental Products, European Products 1985; 1-58.
6. Anagnou-Vrelzides A. et al. Pattern of toothloss in a selected population in Greece. Community Dent Oral Epidemiol 1986; 14:349-52.
7. Baelum V, Fejerskov O. Toothloss as related to dental caries and periodontal breakdown in adult Tanzanians. Community Dent Oral Epidemiol 1986;14:353-7.
8. Kikwilu EN. Occurrence of missing, decayed and filled permanent teeth in Ilala District, Tanzania. Dissertation submitted for fulfillment of the degree of Master of Dentistry of the University of Dar es Salaam 1989.
9. Awadia AK. Hygienic procedures in six regional dental clinics, Tanzania. Tanzania Dental Journal 1992; 5:16-19.