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This is to certify that Dr. Abhishek Kandwal in the department of Oncological Sciences of this University has fulfilled the requirements prescribed for the Ph.D. degree of the Swami Rama Himalayan University, Dehradun.

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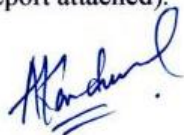
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Comparison of Two Fluoride Application Regime in Oral Cancer Patients; A Randomized Controlled Trial.

by Abhishek Kandwal


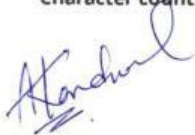
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LIST OF ABBREVIATIONS

S.no	Abbreviations	Full form
1	3DRT	Three Dimensional conformal Radiation Therapy
2	AAIR	Age Adjusted Incidence Rate
3	AG	A group Gel
4	APF	Acidulated Phosphate Fluoride
5	AV	A group Varnish
6	BAHNO	British Association of Head and Neck Oncologist
7	BG	B group Gel
8	BV	B group Varnish
9	CPP-ACP	Casein Phosphate Polypeptide-Amorphous Calcium Phosphate
10	CT-RT	Chemo-Radio Therapy.
11	DENT-A	Dental Evaluation and management
12	DMFT	Decayed Missed Filled Teeth
13	DT	Decayed Teeth
14	EORTC: H& N 35	European Organization for Research and Treatment of Cancer quality of life, Head and Neck 35 module.
15	Et al.	Et alia
16	Etc.	Et Cetera
17	FACT.H&NV 4.0	Functional Assessment of Cancer Therapy Head and Neck module
18	FT	Filled Teeth
19	GATS	Global Adult Tobacco Survey
20	GBD	Global Burden Disease study
21	GLOBOCAN	Global Cancer registry.
22	IARC	International Agency for Research on Cancer
23	IFRS	Intra oral Fluoride Releasing System
24	IGRT	Image Guided Radiation Therapy.
25	IMO	Insufficient Mouth opening
26	INHANCE	International Head And Neck Cancer Epidemiology consortium
27	INR	Indian Rupee
28	IQR	Inter quartile range
29	IVC	Inter rater Validity agreement Consensus
30	MDS	Million Death Study
31	mm.	Millimeters
32	MT	Missed Teeth

33	NACT	Neo Adjutant Chemotherapy
34	NCCN	National Comprehensive Cancer Network
35	NCRP	National Cancer Registry Program
36	NFHS	National Family and Health Survey
37	NNMS	National Non-communicable disease Monitoring Survey
38	OHIP-14	Oral Health Impact Profile -14
39	OHRQOL	Oral Health Related Quality Of Life
40	ORN	Osteo Radio Necrosis
41	PRISMA	Preferred Reporting Items for Systematic Reviews and Meta Analyses
42	QOL	Quality Of Life
43	QOL-OC	Oral cancer Quality Of life questionnaire
44	RT	Radiotherapy
45	SD	Standard Deviation
46	SMO	Sufficient Mouth opening
47	SOCP	Supportive Oral Care Protocol
48	UWQOL	University of Washington quality Of Life
49	WHO	World Health Organization
50	Yrs.	Years

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**“COMPARISON OF TWO FLUORIDE
APPLICATION REGIME IN ORAL CANCER
PATIENTS; A RANDOMIZED CONTROLLED
TRIAL”**

Submitted by

Dr. Abhishek Kandwal

For the degree of
Doctor of Philosophy in

Oncological Sciences
is evaluated and approved by

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SUPERVISOR

EXAMINER



‘ वक्रतुण्ड महाकाय सूर्यकोटि समप्रभ ।

निर्विघ्नं कुरु मे देव सर्वकार्येषु सर्वदा ॥’

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Title: “Comparison of two fluoride application regime in oral cancer patients; A Randomized controlled trial. ”

ABSTRACT

Introduction: Oral cancer ranks first among males and second overall in the Indian population as per GLOBOCAN 2020. In these patients Supportive oral care lack as an integrated part of cancer care. The most prevalent side effect of chemo-radiotherapy (CT-RT) is Radiation caries and their sequel. This results in increased dental disease burden and poor oral health-related quality of life scores (OHRQOL).

Aim: Present Randomized controlled trial was conducted to evaluate the effect of fluoride on dental disease burden in terms of DMFT scores in patients who have received CT-RT in the region of the oral cavity. Oral health-related quality of life in terms of OHIP-14 scores was also assessed.

Materials& Methods: 111 patients participated in the randomized controlled trial as per the CONSORT statement. Two regimens, Monthly, and quarterly application were further divided into varnish and gel subgroups. This resulted in a total of four groups including monthly varnish application (AV), monthly gel application (AG), quarterly varnish application (BV), and quarterly gel application (BG). These were analyzed for DMFT and OHIP-14 scores at baseline, one month, six months, and one-year recall post chemo-radiotherapy (CT-RT).

Results: Median and Interquartile range of DMFT scores for the AV group were 2(0.25-6), 2(1-6), 3(1-7.7), and 4(1-9) at baseline, one month, six months and one

year recall respectively. For the AG group, it was 2(1-5), 2(1-5), 4(1-8), and 5(1-8) respectively. For BV Group it was 3(1-4), 3(1-4), 3(2-6), and 4(2-6) respectively, while for BG Group it was 2(0-4), 2(0-4), 3(1.5-4.5) and 4(2-5) respectively for four recall points. These values were highly significant $P < 0.001$.

OHIP-14 score's Median and Interquartile range at baseline, one month, six months, and one year recall were 14(11-25.7), 35(28.2-40), 5.5(0-6) respectively. For AG group it was 13(2-24), 29(26-36), 6(0-12) and 0(0-6) respectively. For BV group it was 15(10-24), 34(27-46), 3(0-14) and 0(0-7) respectively. While For BG it was 11(5-18.5) 29(23.5-40), 3(0-11) and 0(0-6.5) respectively. These values were highly significant with $P < 0.001$.

Intergroup comparison was not significant for DMFT and OHIP-14 scores for four intervention groups. OHIP-14 score's Mean and standard deviation values for sufficient mouth opening and insufficient mouth opening were 20.6 ± 9.5 and 12.8 ± 9.8 respectively, which was highly significant with $p < 0.001$.

Conclusion: DMFT scores reported a significant and minimal constant increase in patients at one-year recall from baseline. Fluoride application was effective in controlling the DMFT scores at one-year recall in these patients. OHIP-14 scores significantly improved at recall visits from baseline by use of fluoride as part of the Supportive Oral Care Protocol (SOCP). Fluoride varnish and gel applied either monthly or quarterly provided similar changes in DMFT and OHIP-14 scores. Hence any combination of these can be considered effective in the care of these patients. Insufficient mouth opening drastically reduces oral health-related quality of life scores in these patients and hence they required more care.

Clinical Recommendation: Fluoride application as per supportive oral care protocol (SOCP) is recommended as an integral part of the oral care needs of head and neck cancer patients including oral carcinoma. Monthly topical fluoride application during the first year post CT-RT and thereafter-quarterly application lifelong is advised. Involvement of a Dental supportive care expert from the point of diagnosis of cancer is needed. A Dental expert as a part of the multidisciplinary team for cancer care of head and neck cancer patients is recommended.

Keywords: Oral Carcinoma, Head and Neck Cancer, Fluoride Gel, Fluoride Varnish, Supportive Oral Care Protocol, Dental Supportive Care Expert, Oral Health-Related Quality Of Life, DMFT, OHIP-14.