VALUTAZIONE DI UN NUOVO AUSILIO OTTICO PER L'IDENTIFICAZIONE DI LESIONI DELLE MUCOSE ORALI

EVALUATION OF A NEW VISUAL AID FOR THE IDENTIFICATION OF ORAL MUCOSAL DISEASES AND CONDITIONS

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BOLOGNA

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Fig. 1 – oral mucosal autofluorescence detection with Goccles®

dental curing light | dental curing light
Goccles® inspection
normal mucosa *fluo-greenish appearance* | abnormal mucosa *darker appearance*

Fig. 2 – the use of Goccles® in clinical setting

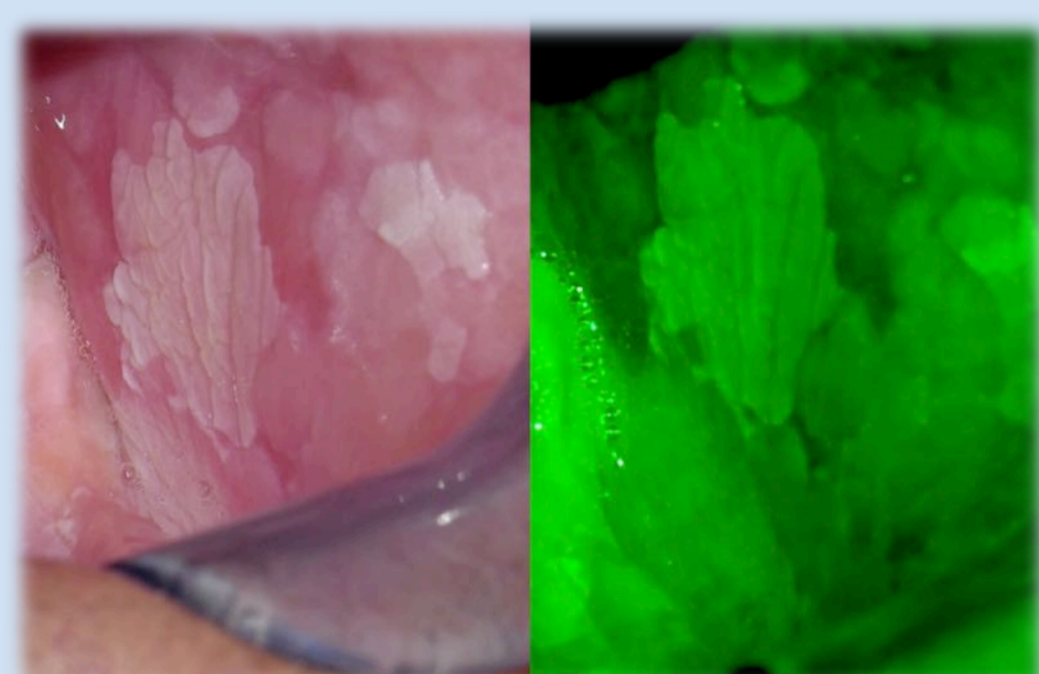Fig. 3 – devices for examination and photographic recording
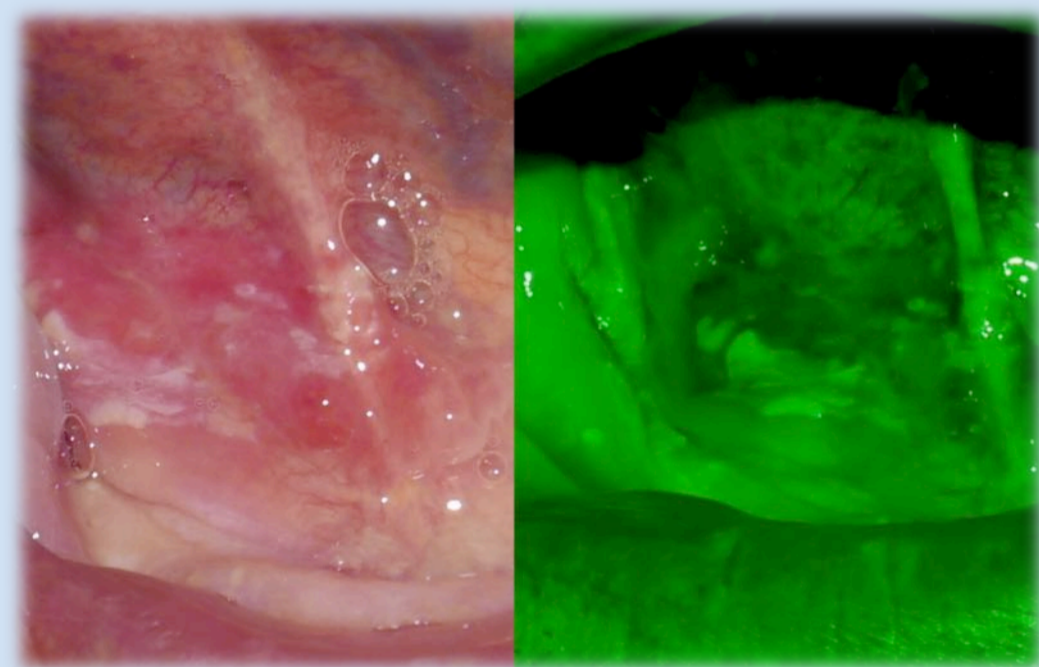

Fig. 4 – clinical case # 1

Fig. 5 – clinical case # 2
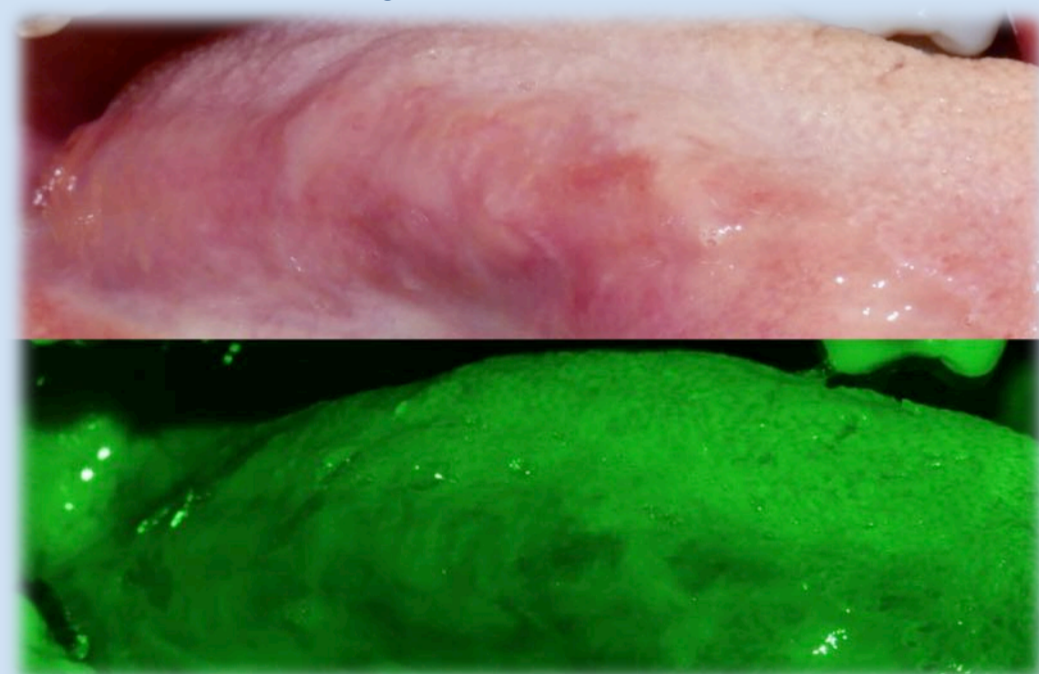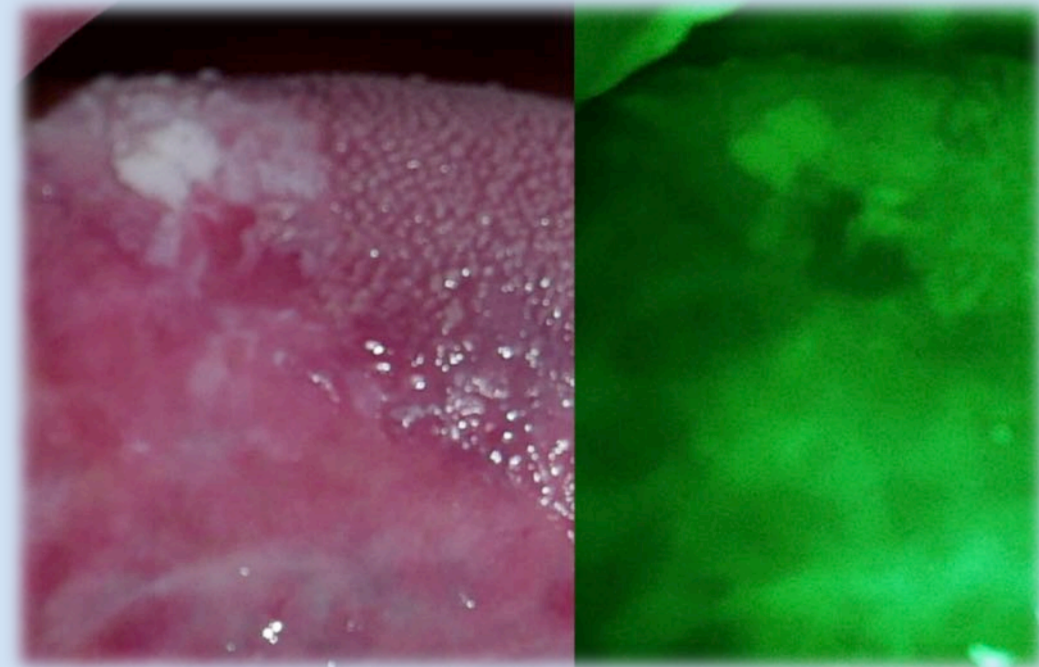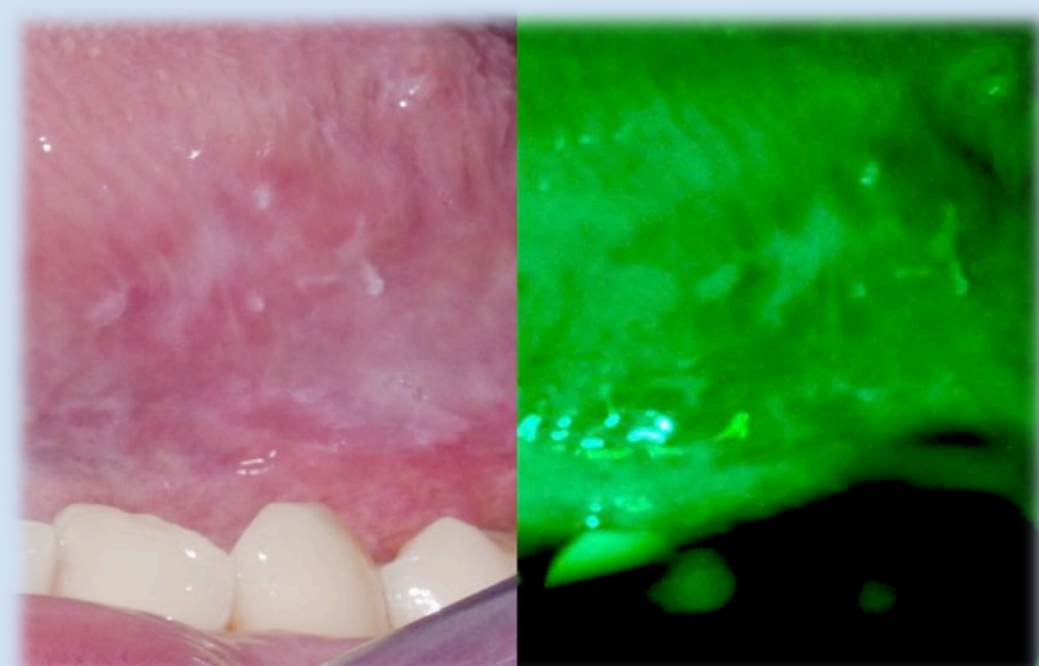

Fig. 6 – clinical case # 4

Fig. 7 – clinical case # 5

Fig. 8 – clinical case # 9

Fig. 9 – clinical case # 15

INTRODUCTION

Recent systematic reviews, expert opinions and best current practices confirm that the clinical examination with accurate visual and tactile inspection of oral tissues could improve the detection and early diagnosis of oral and oropharyngeal cancers and therefore the overall survival rate of affected patients. In the last fifty years various methods have been proposed to enhance the ability of clinicians in detecting benign and malignant oral mucosal conditions with visual oral examination.

It was observed that the *autofluorescence* of tissues or *tissue fluorescence* could potentially be used for cancer screening and detection for a number of anatomic sites including the oral cavity. The fluorescence imaging of oral mucosa involves the exposure of tissues to a rather specific wavelength of light in the blue-violet range, which results in the excitation of autofluorescence of cellular and extracellular fluorophores with the emission of visible light in the green range. The presence of cellular alterations will change the concentrations of fluorophores, affecting the scattering and absorption of light in the tissue, thus resulting in changes in color that can be observed visually, mainly represented by the loss of autofluorescence greenish color with the darkening of the diseased areas and enhancement of their visual detection (fig.1). In recent years, various appropriate instruments have been developed and tested to improve the visual recognition of oral mucosal diseases with different and inconsistent results.

SCOPE

The aim of this preliminary study was to evaluate a new filtered eyeglasses device to reveal the loss of tissue autofluorescence, in a case series of patients with mucosal diseases and conditions.

PATIENTS and METHODS

In 15 consecutive patients treated in the Oral Diagnosis Unit the Goccles® eyeglasses system has been tested and evaluated as a method to improve the detection of oral mucosal inflammation, precancer and cancer during the standard oral visual examination performed by four untrained dentists and dental hygienists assisted by two trained experts in oral medicine and pathology (Goccles® patent licensed to Univet srl, Italy) (fig.2). The autofluorescence has been disclosed lighting up the oral mucosa with a standard dental curing light and the loss of fluorescence classified in relation to the darkness of the involved areas; the relevant fields were recorded with a Panasonic Leica LX-100 digital camera set for oral macro pictures with and without the custom photographic filter supplied by the manufacturer; the manufacturer supplied an additional phographic filter to be used with cellular phones cameras, and we employed it for comparison; figure 3 shows the eyeglasses and other devices employed in the study. The visual and photographic findings were immediately related and compared.

RESULTS

15 patients were examined: 3 affected by oral cancer, 5 with potentially malignant conditions (PVL, FL, OLP), 5 with inflammatory benign conditions (mucosal trauma, MG, candidiasis), 2 with BRONJ. In all patients the diagnosis have been clinically and or histologically confirmed.

pt #	age	sex	clin. Dx	histo. Dx	loss of FL	score	picture
1	75	F	PVL	severe dysplasia	Y	3	4
2	62	M	PVL + EP	mild dysplasia	Y	3-4	5
3	55	F	FL	benign keratosis	N	-	-
4	29	F	previous SCC	mild dysplasia	Y	1-2	6
5	48	F	previous SCC	mild dysplasia	Y	3	7
6	65	F	acute candidiasis	-	N	-	-
7	24	M	mucosal trauma	-	Y/N	1	-
8	34	F	OLP	OLP	Y/N	1	-
9	41	M	OLP – previous in situ SCC	OLP	Y/N	1	8
10	79	M	oral metastasis	mesothelioma	Y	3	-
11	43	F	frictional ulcer	-	Y	2	-
12	64	M	chronic candidiasis	-	Y	1	-
13	39	M	migratory glossitis	-	Y	2	-
14	73	F	BRONJ	ON	bright fluorescence	-	-
15	65	M	BRONJ	ON	bright fluorescence	-	9

DISCUSSION and CONCLUSIONS

The Goccles® device has been able to detect areas of mucosal alteration due to inflammation or malignancy with loss of tissue autofluorescence and different levels of dark appearance; a relevant finding in the study was the self-evidence of mucosal areas with bone exposure due to BRONJ that always showed a vivid and bright appearance. The photographic system and filter are essential to record and archive the relevant clinical pictures of patients and could be improved to simplify the photographic taking procedure and ensure a better reproducibility of results. Another critical issue to be improved is the standardization of the distance and position of the curing light to obtain a correct lighting of the different intraoral areas.

With the innovative Goccles® system it is possibile to enhance the results of a simple, non-invasive and painless clinical oral examination improving the abilities of the clinicians to detect mucosal alterations and diseases of the oral cavity, and perform a screening aimed to the early recognition of oral cancer and premalignant conditions. The autofluorescence examination of oral tissues, in addition to the naked eye examination, contributes to the detection of the actual margins of precancerous and cancerous lesions even in the initial stage. The system works with common curing lights available in every dental setting, it is simply, accessible and easy to use by general dental practitioners, dental hygienists, surgeons, ENT and other specialists in medical fields.

REFERENCES

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