Table 1

In-vivo optical imaging methods to detect OPMD	Basic principle	Advantages	Inconvenient	Interesting studies on methods to detect OPMD
Autofluorescence imaging (AFI)	Visualization of the autofluorescence from endogenous fluorophores (NADH and FAD) Metabolic and morphologic changes related to carcinologic process lead to autofluorescence loss. Altered/dysplastic mucosa appears darker compared with the healthy surroundings.	Practical Cost-effective Non-invasive	Low specificity: - False positives: tissues with rich micro vascularity (granulation tissue, inflammation, and edema) - False negatives: regions with hyperkeratosis (Leukoplakia+++) or overgrowth of bacteria (producing extra fluorophores)	[5] [72] [73]
Targeted Fluorescence imaging (TFI)	Visualization of a fluorescence probe specifically targeting the neoplastic tissues	The targeted **immune**-fluorescence imaging: targeting an over-expressed protein by approved antibodies	Intra-tumor phenotype heterogeneity decreases it sensitivity	[5]
Narrow band imaging (NBI)	Visualization of the neoangiogenic patterns of tissues using an illumination light within the absorption spectrum of hemoglobin	The abnormal intra epithelial capillary loops (ICPL) patterns can be used to differentiate neoplastic from normal tissues The NBI endoscopic system is widely available	Characterization of IPCL patterns is subjective and false positive results are frequent (level of keratinization, lymphoid tissue, previous radiation or surgery, inflammation and vascular lesions)	[5] [76] [77]
High resolution microendoscopy (HRME)	Visualization of an emitted light by superficially applied fluorophores using a flexible fiber-optic probe placed in direct contact with the suspicious tissue	Cost effective Noninvasive High resolution High sensitivity and specificity Simple and portable device Requires minimal training High inter-rater reliability	Not commercially available The proflavine (the most commonly used contrast agent) is not not approved for *in-vivo* clinical use Limited field-of-view	[5] [78]
Raman Spectroscopy (RS)	Visualization of the 'molecular fingerprint' (i.e. variations of chemical components) of a tissue using vibrational spectroscopic technique	Water absorption does not disturb the measurement High signal-to-noise ratio Fewer sample volumes are required for analysis.	Analyzes are difficult No commercially available Too large for routine clinical use Time consuming	[5] [79] [80] [81] [82]

Table 2

Cell line	Dysplasia features	References
D9	Mild or Moderate dysplasia of ventral tongue	[48]
D20	Moderate dysplasia of lateral tongue	[48]
D34	Moderate dysplasia of posterolateral tongue	[48]
D38	Mild dysplasia of lateral tongue	[48]
DOK (dysplastic oral keratinocyte)	Epithelial dysplasia from the dorsal tongue of a 57-year-old heavy smoker	[89]
POE9n	Severely dysplastic oral epithelial lesion of a 65-year-old male possessing a homozygous deletion at the p16INK4A/p14ARF locus, lacking p53 expression, and exhibiting an extended but finite replicative life span	[90]
MSK Leuk1	Spontaneously derived from an oral leukoplakia lesion	[91]
Leuk1	Dysplastic leukoplakia adjacent an early invasive OSCC (T1N0M0) involving the tongue of a 47-year-old female	[92]
Leuk2	Dysplastic leukoplakia in a 72-year-old female with a history of recurrent new disease	[92]
LDOK	Severe dysplasia on the lingual alveolus, carrying a p53 gene mutation (G-T at codon 248) and does not express p16	[93]
CDOK	Mild dysplasia at the commissure	[93]
LTDOK	Mild dysplasia on the lateral tongue	[93]
SPDOK	Moderate dysplasia on the soft palate	[93]
VU-pre-SCC M3	Glottic laryngeal tumor with dysplasia in the mucosal resection margin	[47] & [94]