SMART DENTASSIST

Interactive System for Dental Support and Patient Management
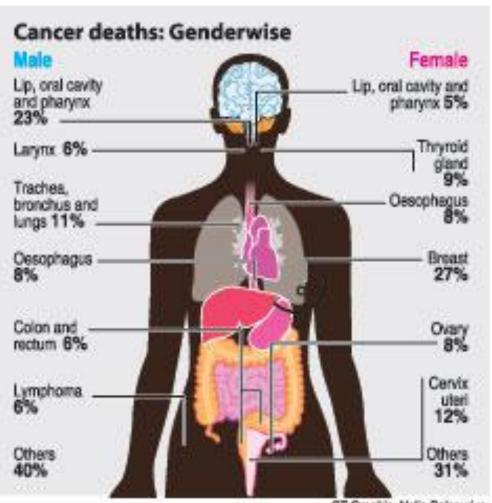
Why Periodontal diseases are so common ?

Unawareness

- According to the **Sri Lanka Annual Health Bulletin**-2012, the unawareness of dental diseases

    - **children - 75.81% ,**

    - **adults - 44.39%**

    - **elderly - 71.15% .**

- According to the **National Oral Health Survey,** prevalence of Gum Diseases ;

  - 12-year-olds **-** 76 %

  - 15-year-olds **-** 74 %

  - 44 to 53-year-olds **-** 91 %
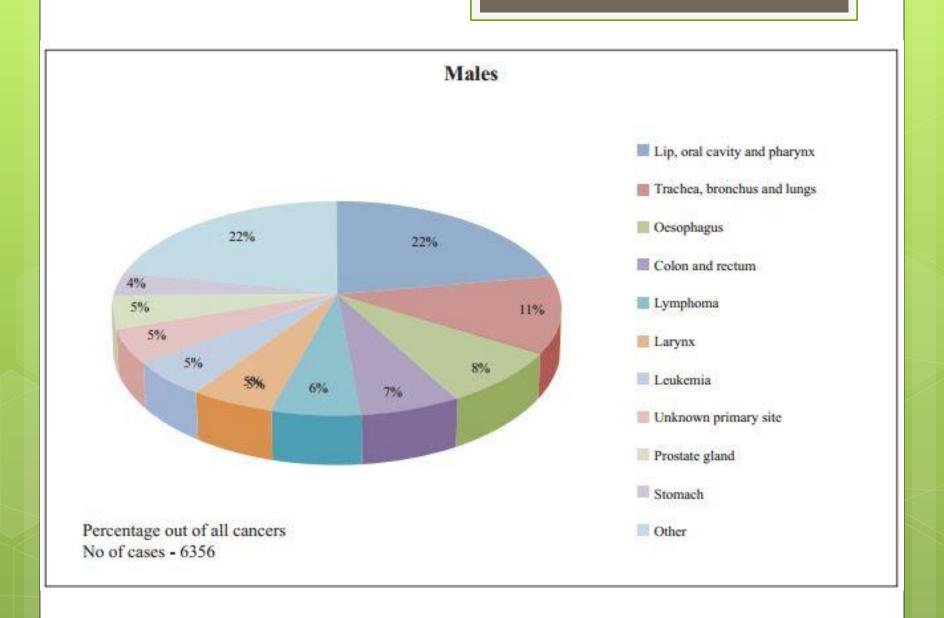
  - above 65 years - 99 %

Poor education

- on dental caries & periodontal diseases

- on causes

- on prevention

- on its impacts

- on importance of regular checkups

- According to Dr. K. A. A. S. Warnakulasuriya (Dental School - University of Peradeniya)

  "The commonest site in which **mouth cancer** occurs in **Sri Lanka** is inside the cheek, called the "buccal cancer". This can be related to the habit of keeping or carrying **betel** quid adjacent to the cheek. The area behind the last standing tooth (Wisdom tooth) in the lower jaw called "retro-molar site", where the quid may stagnate and thereby predispose to cancer. "
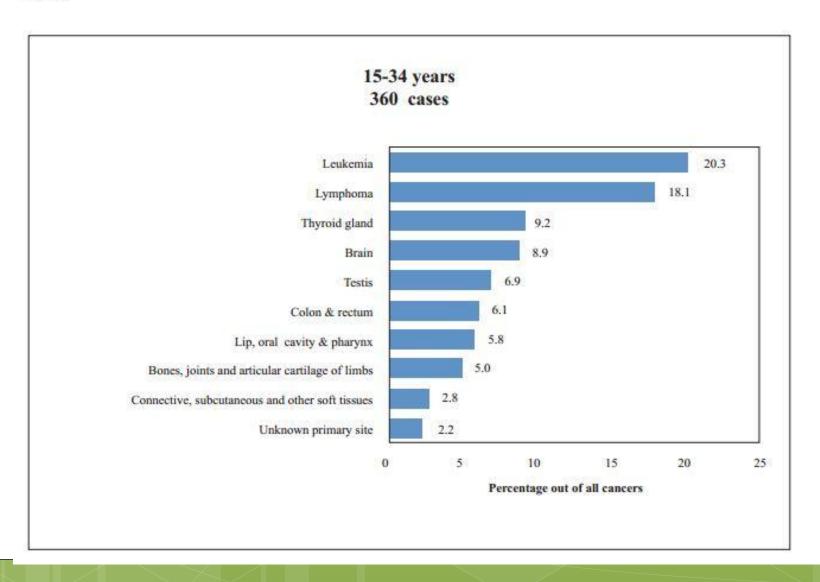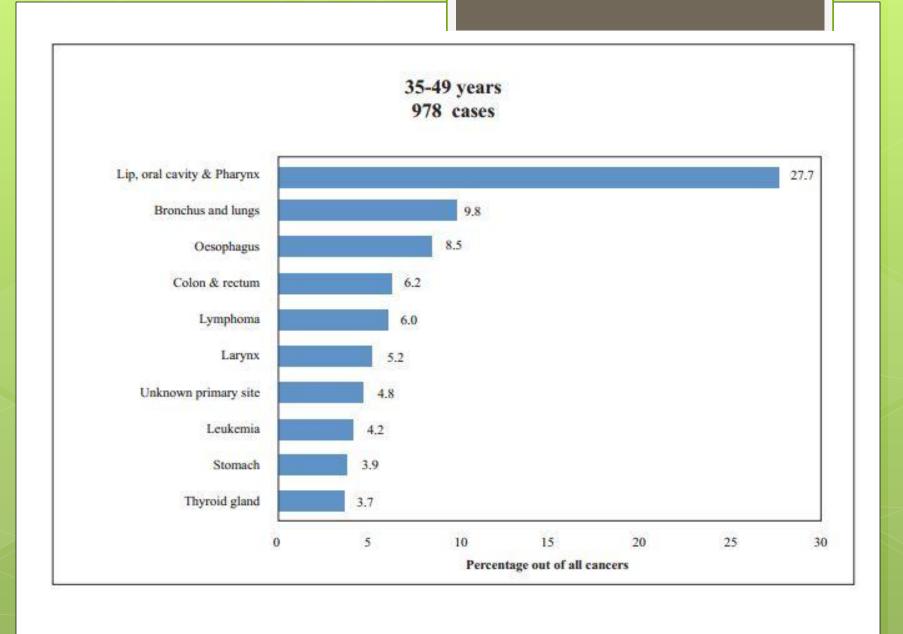
Cancer deaths: Genderwise

Male

Lip, oral cavity and pharynx 23%

Larynx 6%

Trachea, bronchus and lungs 11%

Oesophagus 8%

Colon and rectum 6%

Lymphoma 6%

Others 40%

Female

Lip, oral cavity and pharynx 5%

Thyroid gland 9%

Oesophagus 8%

Breast 27%

Ovary 8%

Cervix uteri 12%

Others 31%

ST Graphic: Nalin Balasuriya
Source: National Cancer Control Programme

Males

Percentage out of all cancers
No of cases - 6356

Legend:
- Lip, oral cavity and pharynx
- Trachea, bronchus and lungs
- Oesophagus
- Colon and rectum
- Lymphoma
- Larynx
- Leukemia
- Unknown primary site
- Prostate gland
- Stomach
- Other

Pie chart values: 22%, 11%, 8%, 7%, 6%, 5%, 5%, 5%, 5%, 4%, 22%

15-34 years
Male

15-34 years
360 cases

Cancer Type	Percentage
Leukemia	20.3
Lymphoma	18.1
Thyroid gland	9.2
Brain	8.9
Testis	6.9
Colon & rectum	6.1
Lip, oral cavity & pharynx	5.8
Bones, joints and articular cartilage of limbs	5.0
Connective, subcutaneous and other soft tissues	2.8
Unknown primary site	2.2

Percentage out of all cancers

35-49 years
978 cases

Cancer site	Percentage
Lip, oral cavity & Pharynx	27.7
Bronchus and lungs	9.8
Oesophagus	8.5
Colon & rectum	6.2
Lymphoma	6.0
Larynx	5.2
Unknown primary site	4.8
Leukemia	4.2
Stomach	3.9
Thyroid gland	3.7

Percentage out of all cancers

Cancer Incidence Data - 2007

50-64 years
Male

50-64 years
2510 cases

Cancer Site	Percentage
Lip, oral cavity & pharynx	24.2
Bronchus and Lungs	13.1
Oesophagus	8.6
Colon & rectum	7.6
Larynx	6.8
Unknown primary site	5.7
Stomach	3.5
Lymphoma	4.6
Prostate gland	3.5
Hematopoietic and reticuloendothelial system	3.3

Percentage out of all cancers

65 years and above
Male

65 years and above
2262 cases

Site	Percentage
Lip, oral cavity & pharynx	22.8
Bronchus and Lungs	12.9
Oesophagus	9.9
Prostate gland	9.2
Larynx	6.1
Colon & rectum	5.9
Unknown primary site	5.6
Lymphoma	4.2
Hematopoietic and reticuloendothelial system other	3.9
Bladder	2.9

Percentage out of all cancers

Table 12: Lip, oral cavity and pharynx
Incidence data 2007

Group	Number	Percentage	ASR	Cum. Rate
Male	1415	22.3	16.0	1.91
Female	398	5.5	4.0	0.49
Total	1813	13.3	9.6	1.17

ASR: Age standardized rate per 100,000 world population

Cum. Rate- Cumulative Rate (0-74 years) per 100 population

Lip, Oral Cavity and Pharynx

- **Doctors are not well equipped**

  - low usage of intraoral cameras

  - Low usage of technology in rural areas

  - Unavailability of decision support systems

  - Unavailability of knowledge base

- **Medical facilities / personnel are not equally distributed**
  - Number of **dental surgeons** per 100,000 population = 6.0
  - Number of **dental specialists** = 59
  - Premier institutions for oral health care :
    - Dental Institute, **Colombo**
    - Institute of Oral Health, **Maharagama**
    - Dental Hospital (Teaching) , **Peradeniya**

How to decrease Periodontal diseases ?

For people -

- Provide proper dental health education

- Advise people to visit dental clinics regularly

- Educate them on their dental conditions

For dentists -

- Improve dental equipment and technologies

- Provide rural areas with proper facilities

- Provide a way to connect dentists with specialists

- Provide a constantly updating knowledge base

To bridge this gap ….

Smart Dentassist's features

- ✓ **Oral Health Education**

- ✓ **Patient Management System**

- ✓ **Teleconferencing System**

- ✓ **Diagnosing, treating and simulating outcome**

- ✓ **Dental Information Knowledge Base**

SMART DENTASSIST Hardware Components
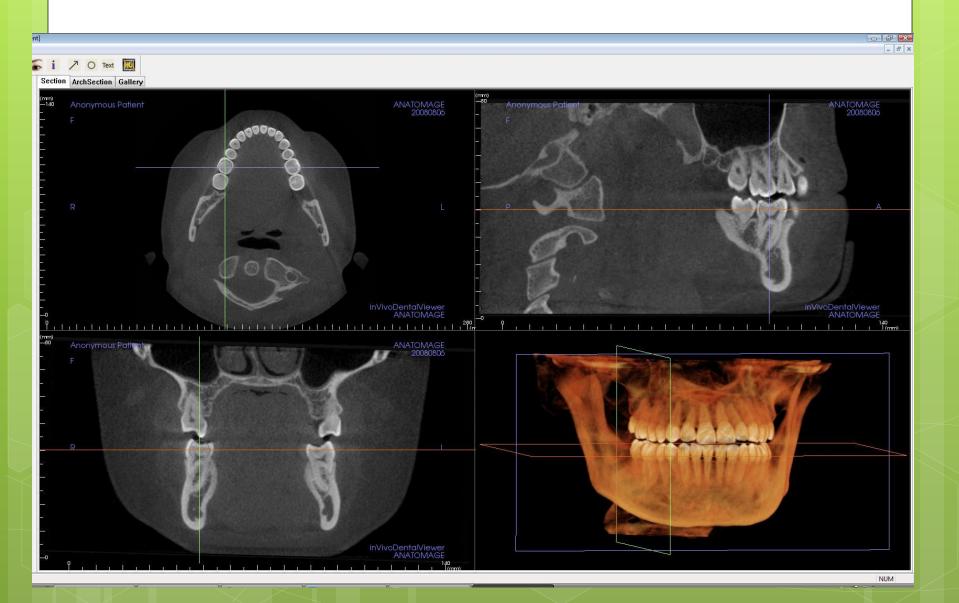
SMART DENTASSIST Benefits

For Dentists

- Ease of access of enhanced technology and knowledge

- Easy communication among dentists for dental issues

- Constantly updating knowledge base

For Dentists …

3D modelling ...
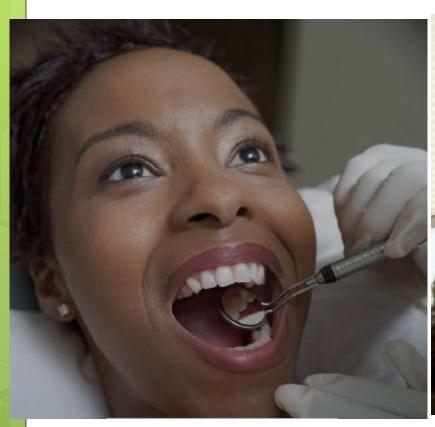
For Patients
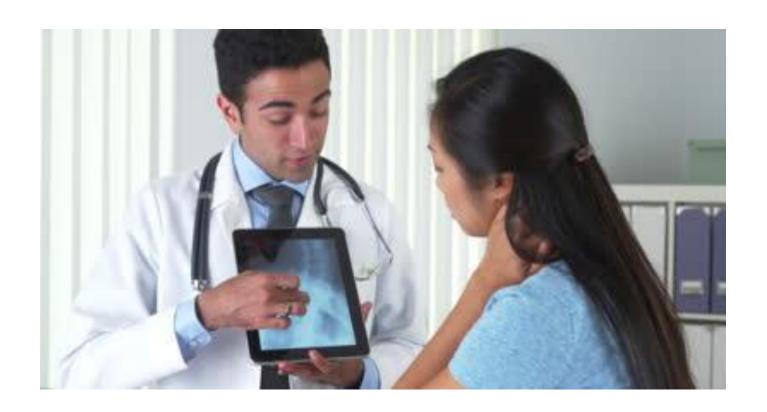
- **Enhanced dental care**

- **Better dental education & understanding**

- **Ability to view simulation of treatment & outcome**
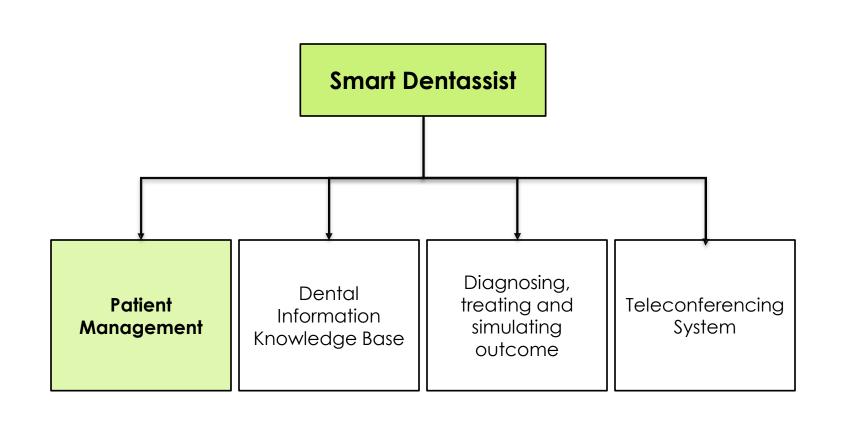
Mouth Mirrors vs Intraoral Cameras
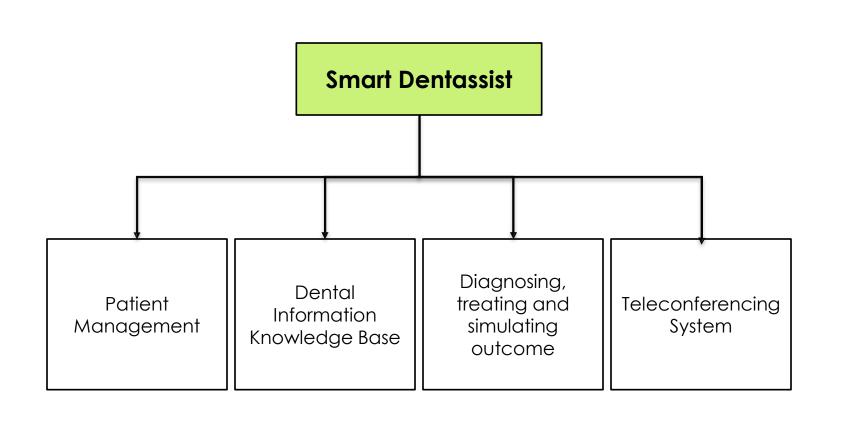
Better education

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Objectives

- To provide a **better dental health care** service to patients, irrespective of where they live.

- To **educate patients** clearly on their dental conditions with the visual output of intra oral cameras.

- To provide patients with a **better understanding** of the outcomes of treatments carried out.

- For "**knowledge balancing" among dentists**

- To provide **better communication** facilities for dentists

- To create a "**Knowledge Base" for dentists**
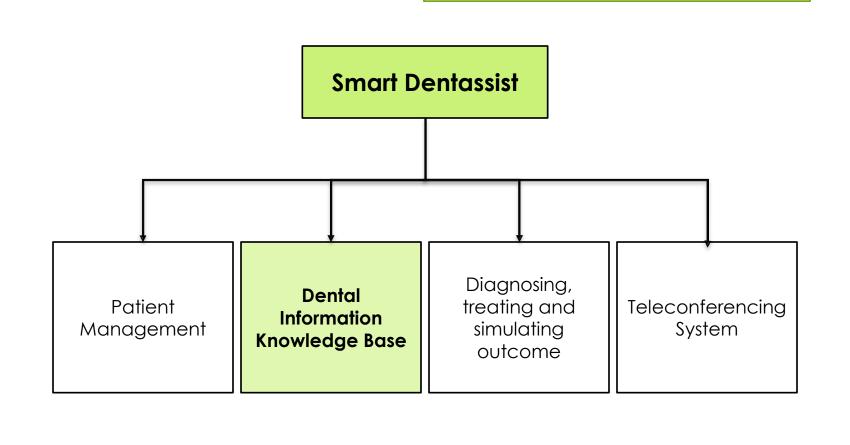
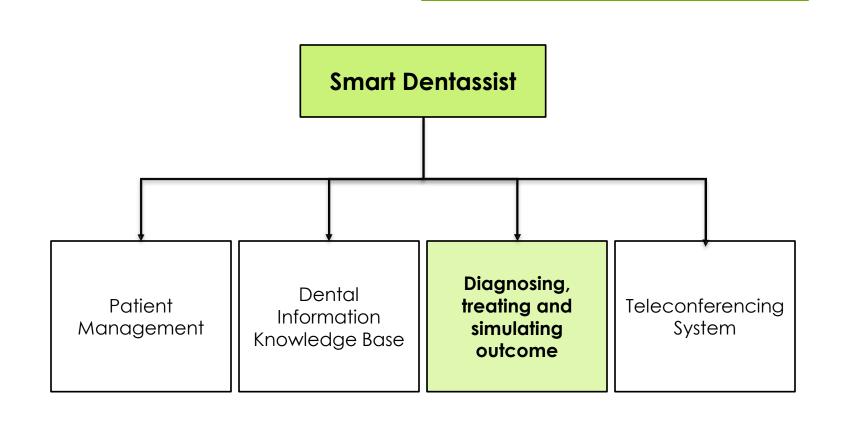# Smart Dentassist Features

✓ **Patient Management System**

- ✓ Proper patient database
- ✓ Send reminders for dental checkups
- ✓ Maintain patient's dental images
- ✓ Maintain comments on images
- ✓ Maintain dentist's schedule
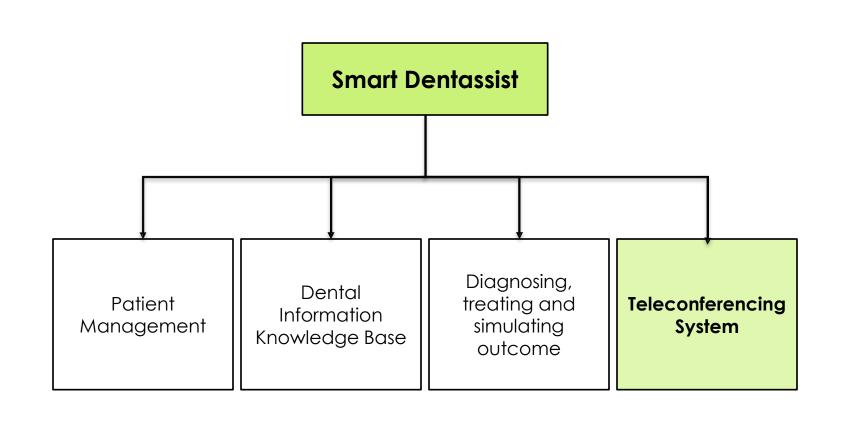- ✓ Generate virtual waiting list

✓ **Dental Information Knowledge Base**

- ✓ Maintain dental images & comments

- ✓ Maintain treatments, drugs

- ✓ Process images captured from intraoral camera

- ✓ Share content to remote locations

- ✓ Allow dentist to browse previous cases

✓ **Diagnosing, treating and simulating outcome**

    ✓ Decision support system

    ✓ 3D graphic modeling of patient's current condition & outcome of treatment

    ✓ Simulating the treatment process

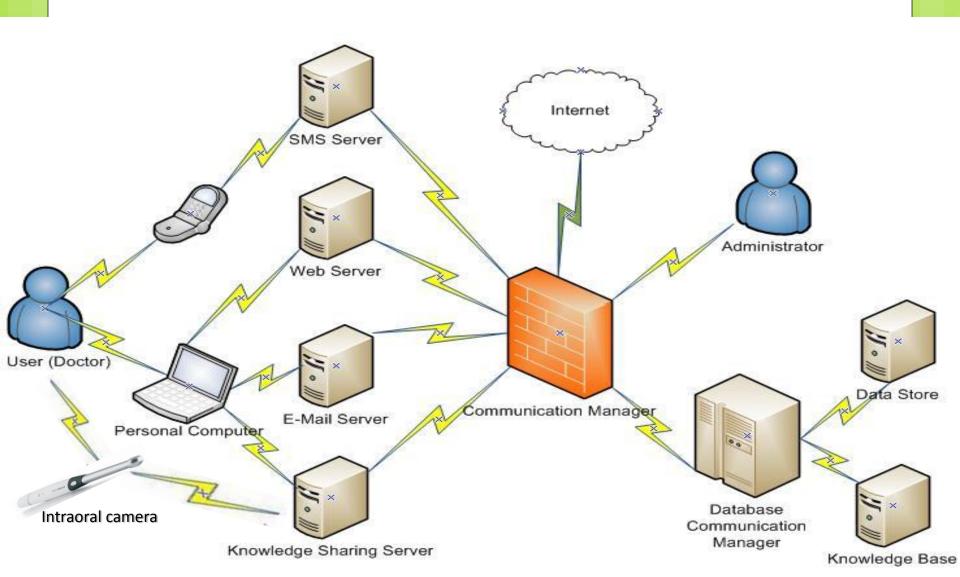   ✓ Treatment suggestions based on images captured from intraoral camera

✓ Teleconferencing System

- ✓ Connecting dentists to consultants & specialists

- ✓ Live stream videos from intra oral camera

- ✓ Share dental images

- ✓ Transmit images & live stream video to tablet PC for patient's viewing

Technologies to be used…

- Image Processing. (Dental Imaging)

- Game development software to model simulations.

- 3D modelling to model dental structures

- 2D to 3D conversion

- Statistical data analysis.

SMART DENTASSIST

References

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[2] "Oral Health", *National Institute of Dental and Craniofacial Research,* available: http://www.nidcr.nih.gov/oralhealth/, [accessed : 28.01.2015]

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Thank you!