DISCUSSION:
The results of this study are discussed under the following headings:

1. Validation of the Nepali version of Psychosocial Impact of Dental Aesthetic Questionnaire.
2. Validation of the Nepali version of the Derriford Appearance Scale 59.
3. Validation of the Nepali version of the Patient Expectation of Orthodontic Treatment Questionnaire.
4. Psychological adjustment and impact of facial and dental appearance on adult patients with craniofacial anomalies and their expectation while seeking orthodontic treatment.

Validation of the Nepali version of Psychosocial Impact of Dental Aesthetic Questionnaire:
Translation and validation of a questionnaire is a rigorous process that incorporates various steps. When applying to different regional, ethnic and social settings it is of paramount importance that the questionnaire measures the same construct with same accuracy. Various studies highlight the common pitfalls and suggest recommendations. (Liamputtong, 2010; Su, 2002; Terwee, 2007) In this study a recent rigorous protocol by Gjersing et al (Gjersing et al, 2010) for cross-cultural adaptation of research instruments was used (Figure 1). This protocol involved language, setting, time and statistical considerations.

This Nepali translation has good internal consistency as determined by a cronbach’s alpha value of 0.945 which is greater than the original and Brazilian version (Sardenberg et al, 2011) and equivalent to the Chinese version. (Lin et al, 2011) “Cronbach alpha if item deleted” had shown that if an item was deleted there is no significant increase in its value signifying good internal consistency of the items. The corrected total item correlation was greater than 0.5 for each item and ranged from 0.525 to 0.790 showing that the various items were significantly correlated to each other. (Table 1) The test–retest reliability was higher than 0.9 and could be considered excellent.

As compared to the original scale and Chinese translation where 4 and domains were present, the current translation incorporated five domains. When subjected to principal component factor analysis with orthogonal rotation 5 factors were extracted the five components have Initial Eigen values greater than 1, further the scree-plot confirmed the extraction of 5 components and they could explain 73.26% of the total variation. We also tried factor analysis with no of components
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fixed to three and four but there was a lot of mixing of items along originally proposed domains and some items could not load sufficiently on the analysis whereas taking 5 factors gave good item factor loadings and a new factor was formed without mixing of items along sub domains (Table 2). Self consciousness is an acute sense of self awareness. It is more related to preoccupation with one self and a feeling that oneself is observed by others. (McGaighey, 2011;Laing, 1960) All the items that fall in 5th component were coincident with this idea. Therefore a nomenclature “Dental Self consciousness” was used. It is interesting that Nepali young adults segregated these items from social impact and psychological impact domains of original instrument. One item “I sometimes catch myself holding my hands over my mouth to hide my teeth” has good factor loading under psychological impact as compared to social impact, this may be due to different perception and understanding of these concepts by Nepali young adults as compared to other population groups. Similarly one item from “dental self confidence” domain of original instrument “I like to show my teeth when I smile” had good factor loadings in the “Aesthetic concern” domain again attributed to conceptual differences among various populations. The scale had good criterion validity as its domains correlated well with the IOTN-AC and POS scale with the individuals having high values for Nepali PIDAQ exhibited higher IOTN-AC and POS values (Table 3,4).The scale showed excellent responsiveness as there were significant differences between the scores of individual who had demand and who did not demand orthodontic treatment in all sub-domains. (Table 5)

Validation of the Nepali version of the Derriford Appearance Scale 59:

This study describes the translation and validation of DAS59 into Nepali. The translation procedure is already explained in detail in the methodology section. The overall internal consistency was excellent (α = 0.98) and was equal to that of the original article that first described the scale.(Carr et al , 2005) There was good correlation between all the items representing a good homogeneity (Table 6). Domains also demonstrated good internal consistency and correlation within themselves. The test-retest reliability was also good.

The Construct validity of the Nepali DAS59 was assessed under convergent and Discriminant validity. Discriminant validity was demonstrated by highly significant differences between the clinical population having appearance concern and nonclinical population with no facial concern
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(Table 7). Convergent validity was confirmed by significant correlation between DAS59, BDI, BAI and GHQ. (Table 8)

Validation of the Nepali version of the Patient Expectation of Orthodontic Treatment Questionnaire:
The current study assessed the reliability and validity of patient's expectation of orthodontic questionnaire in Nepali population. The internal consistency as accessed by Cronbach's alpha was acceptable and it is comparable to the original version. The cronbach's alpha 'if item deleted' doesn't increase significantly if any of the item was deleted. Therefore all the items should be retained. The corrected inter correlation also exceeded the general requirement (Table 9). Test retest reliability at four week interval was excellent and in fact better than demonstrated in the original study.(Table 10)

The instrument has a good validity as described in the original version due to the use of an open ended questionnaire which was used to develop a closed questionnaire with responses. Face validity was found to be satisfactory by virtue of relevant questions and subjective assesment. (Singh, 2011). To establish construct validity 100 participants were asked to fill the questionnaire followed by an interview with a researcher on the theme of questionnaire which was recorded and filled in the form of questionnaire by second researcher. This was done so as to assess whether the subject is expressing what he/she knows about the theme correctly and whether the instrument is capable of measuring the underlying construct. There was excellent agreement between the responses in these two situations and hence, demonstrating good construct validity.(Table 11)

Psychological adjustment and impact of facial and dental appearance on adult patients with craniofacial anomalies and their expectation while seeking orthodontic treatment.
Many studies and reviews suggest that although there are no significance differences in psychological functioning of patients with craniofacial anomalies as compared to general population norms. But these studies report some difficulty in particular area of functioning. (Mc Williams,1982; Richman and Eliason, 1982; Madison,1986; Eliason, 1991; Tobiasen and Hiebert, 1993; Turner et al, 1998; Endriga and Kapp-Simon, 1999; Thompson and Kent, 2001;
Lockhart, 2003). There are substantial proofs of appearance concern due to poor facial appearance in this population and dissatisfaction with facial appearance. (Tyl et al, 1990; Richman, 1976; Kapp, 1979; Thomas et al, 1997; Marcusson et al, 2001; 2002). This dissatisfaction with facial appearance may lead to behavioral problems. (Clifford, 1969; Richman, 1983; Richman et al, 1985). However others contradict this fact and suggest that subjects are pleased with their facial appearance (Clifford et al, 1972; Bjornsson and Agustsdottir, 1987; Slifer et al, 2003). Many studies point out that adult population is at the risk of psychosocial problem due to concern of facial appearance. (Ramsted et al, 1995; Bernstein and Kapp, 1981; Cochrane and Slade, 1999; Berk et al, 2001) as compared to children who have shown good or even high level of self esteem as reported by some authors. (Kapp, 1979; Leonard, 1991; Persson et al, 2002; Brantley and Clifford, 1979). The results of this study have supported the hypothesis that adult subjects with craniofacial anomalies have more psychosocial impact due to facial and dental appearance. Facial and dental esthetics overlaps each other considerably as the former is influenced by the later. In the current study both DAS and PIDAQ scores were significantly higher in patients than controls indicating considerable psychosocial impact of facial and dental esthetics. (Table 14, Graph 3)

In this study it was shown that there are no differences for gender on DAS59 scores in patients. This means that there was no difference for gender in terms of psychological adaptation to altered facial appearance. This is in accordance to Kiyak and Bell (Kiyak & Bell, 1991) who stated that there were no gender differences on extroversion, self esteem or overall body image in the pre-surgical assessment of patients needing orthognathic surgery. Further Versnel et al (Versnel, 2010) in their study titled “Satisfaction with facial appearance and its determinants in adults with severe congenital facial disfigurement” said that gender was not a determinant of satisfaction with facial appearance. This is in contrast to the norms that are developed for two clinical populations by the developers of DAS59 where females have higher scores as compared to males, however this can be explained by the fact that those two clinical populations are different from the one here (Carr, 2000). It was interesting that there was statistically significant difference for overall psychological impact of dental aesthetics and specifically psychological impact in males and females with females having higher scores for both [Table 15(A), Graph 4]. This may be explained by the fact that females are more concerned and dissatisfied by their
dental appearance as compared to males. (Tin oo et al, 2011). There was no effect of area of residence on psychological impact of facial and dental appearance in patients. This was in accordance with Versnel et al. (Versnel, 2010) for facial appearance and there is no report in literature for dental appearance in this regard. However controls showed significant differences in terms of effect of area of residence with Negative self concept (NSC) sub-domain of DAS59 and PD4 (Aesthetic Concern) sub-domain of PIDAQ with urban individuals having higher scores for DAS59 while rural subjects had higher scores for PD4. Both of which indicates poor psychosocial adjustment in subjects from rural areas. The self perceived influence is determined by many factors of which media is one of the most important and has twice as much influence on urban individuals than rural (Wilson et al, 2009). There was a significant relation of age of presentation with DAS59 with all domains exhibiting a positive correlation except NSC which displayed a negative one. These findings are in contrast with Thomas et al who have shown that adolescents are more dissatisfied than young adults with their facial appearance. These differences may be attributed to cultural, ethnic and social differences between the populations studied. But there was no significant relation found for dental appearance. This was in accordance with Tin oo et al (Tin oo et al, 2011) who found no relation of age with satisfaction with dental appearance stating that dental looks are important to younger as well as older adults. This is may be due to the great desire of looking pretty and young in males and females in current times and role of media in promoting it. In controls age was related positively to negative self evaluation of their facial appearance in contrast to patients where it was negatively correlated, this may be explained by the fact that in controls (individuals with normal facial appearance) with facial changes due to ageing they evaluate their facial appearance negatively.

In the current study there was no influence of educational level on psychological impact of facial appearance however it was related to dental aesthetics under three sub-domains of PD2, PD4, PD5 and PIDAQ score. The relation was positive with increase in educational level was negatively related to these sub-domains and total PIDAQ scores. This means that patients with higher education showed better psychological adaptation to dental appearance and had less scores. This is in accordance with Versenal et al in a recent study stated that subjects with higher educational level were more satisfied with their appearance because they are more realistic and understand that normal appearance is difficult to achieve. However as stated above this was not
true for facial appearance in this study and could be explained on the account of different ethnic, cultural and social settings. In controls educational level is negatively related to SSC and positively with NSC and was insignificant for other parameters. This means that higher educational level was associated with decreased social self consciousness which could be explained by the fact that individuals who attain higher education have more social interaction and have developed enough self confidence as compared to individuals with less educated ones. However positive correlation with negative self concept was difficult to explain but may point that although these individuals despite of their higher education and good social skills evaluate themselves more negatively because of the fact that they have wider social circuit comprising of normal people which may make them feel different.

There were no significant differences in severity between assessment by a specialist and the subject itself. This shows that there is an agreement between the clinicians and subjects for the severity of his/her condition. Objective severity and subjective severity were related significantly to psychological adaptation to altered facial appearance with subjective severity related more strongly than objective. Subjects who rate their appearance problem as more severe have higher scores as compared to those who rate it less; further the same is true for objective assessment by clinician however the psychological adaptation was more closely related to subjective assessment. This is in accordance with Moss (Moss, 2005) who demonstrated a linear relationship between subjective adjustment and severity, with greater perceived severity associated with poorer adjustment. Similarly he also demonstrated a weak but statistically significant quadratic relationship between objectively rated severity and adjustment.

The subjective severity was related to psychological adaptation to dental appearance specifically with sub-domain 3 (Psychological impact. The patients who had perceived their problem to be more severe had higher scores and poor psychological adaptation.

The expectations of patients seeking treatment are very important factor for the success of the treatment and satisfaction of the patient with the final outcome. This study shows that there are significant differences in the expectation of patients with craniofacial anomalies as compared with controls. The patients with craniofacial anomalies tend to have higher expectations that they
have a check-up and diagnosis, discussion about treatment and oral hygiene checked at the initial appointment as compared to controls. This may be due to the fact that they might have visited dental centers previously many a times as compared to controls and are aware of protocols. Regarding type of orthodontic treatment, patients with craniofacial anomalies are more unaware of the type of braces they may receive; expect that there are less chances that their teeth will be extracted, they are more likely to receive removable braces and less chances for any jaw surgery as compared to controls. These differences may be due to the fact that they are more conservative in their approach and had already undergone multiple surgeries for correction of their deformity and they may favour removable braces as fixed braces may be further detrimental to their already compromised facial esthetics.

However they think that wearing the braces will be less painful when compared to controls as they have undergone various surgeries previously and had more painful experiences therefore braces is a relatively small thing. They also think that wearing braces will cause problems with eating as compared to controls. This can be explained by the fact that they have increased prevalence of dental anomalies than normal populations further they already could have experienced several problems with dentition an mastication. Therefore they may see braces with more suspicion in causing discomfort while eating.

Regarding the duration of treatment there was a significant difference and patients with craniofacial anomalies estimated a long duration of orthodontic treatment as compared to controls. This may be due to the fact that patients with craniofacial anomalies regularly visit the hospital from a very early age and could have gone through a long multispecialty treatment; therefore they estimate this treatment to be relatively long.

Patients believe that orthodontic treatment will improve their chances of good career and will give them more confidence socially as compared to controls. This may be due to the fact that they have a great desire to improve their overall facial and dental appearance and they consider it as an important factor in their social interactions.