The Psychological Impacts of Horizontal Frontalis Lines, Glabellar Lines, and Lateral Canthal Lines: Qualitative, Patient-Centered Studies

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INTRODUCTION

- Facial lines or wrinkles are a common sign of aging, developing slowly over time due to repeated contraction of underlying facial muscles[1-3]
- In the upper face, 3 types of facial lines are common: lateral canthal lines (crow's feet lines; CFL), caused by smiling or squinting; horizontal frontalis lines (forehead lines; FHL), caused by raising of the eyebrows; and glabellar lines (GL), caused by frowning[1]
- With age, these upper facial lines (UFL) tend to become static and visible, even when facial muscles are at rest[1]
- The development of UFL can influence self-perception and may have a variety of psychological impacts[1,2]

OBJECTIVE

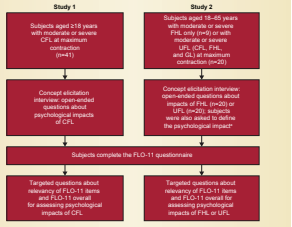
- To determine the psychological impact of CFL and FHL individually and of the 3 UFL areas combined
- To evaluate whether the 11-item Facial Line Outcomes (FLO-11) Questionnaire[3] is an adequate measure to assess CFL, FHL, and UFL psychological impacts

METHODS

Subjects

- Two qualitative research studies **(Figure 1)** were conducted in adults with moderate or severe UFL (ie, CFL, FHL, and GL) at maximum contraction, as measured using the investigator-rated Facial Wrinkle Scale with photonumeric guide (FWS; 0=none; 1=mild; 2=moderate; 3=severe)
- Study 1 enrolled subjects aged ≥18 years with moderate or severe CFL at maximum smile
- Study 2 enrolled subjects aged 18–65 years with moderate or severe FHL at maximum eyebrow elevation only, or in conjunction with moderate or severe CFL at maximum smile, and moderate or severe GL at maximum frown
- All subjects were fluent in English
- Key exclusion criteria:
  - Prior periorbital surgery, facial or brow lift, or related procedure, or midfacial or periorbital treatment with permanent soft-tissue fillers, polytetrafluoroethylene (Gore-Tex) implantation, or autologous fat transplantation
  - Nonablative resurfacing laser/light treatment, microdermabrasion, or superficial peels within 3 months
  - Cosmetic procedure with medium depth to deep facial chemical peels, midfacial or periorbital laser skin resurfacing, or permanent make-up within 6 months
  - Midfacial or periorbital treatment with non-permanent soft-tissue filler within the previous 12 months
  - Botulinum toxin treatment within 6 months

Figure 1. Study Designs



*Eleven subjects in addition to the 9 subjects with FHL only completed interviews about the impact of FHL. CFL, crow's feet lines; FHL, forehead lines; GL, glabellar lines; UFL, upper facial lines.

Interview Conduct

- Both studies included a concept elicitation (CE) phase, followed by targeted questions about the relevancy of the FLO-11 questionnaire. All interviews were audio or video recorded, with each subject's permission
- In the CE phase, subjects were asked open-ended questions by trained interviewers about the psychological impacts of their particular facial wrinkles: CFL in study 1, and FHL or UFL combined (ie, CFL, FHL, and GL) in study 2
  - Probing questions were asked, if necessary, to elicit concepts related to the psychological impact of their particular facial wrinkles
- Following the CE phase, subjects were asked to complete the FLO-11 questionnaire and provide feedback on the relevancy of each item to the psychological impact of their particular facial wrinkles

Analysis

- Interview transcripts were imported into ATLAS.ti version 7.0 (Atlas.ti GmbH; Berlin, Germany) to facilitate the organization and analyses of qualitative data. Transcripts were analyzed on an ongoing basis, using a grounded theory approach to produce rich descriptions and theoretical explanations for the topic
- Codes consisting of root concepts elicited from the subjects and related to the research questions were linked to relevant portions of the transcript texts. Each coded transcript was reviewed by ≥2 members of the project team until a consensus was reached
- At the end of the coding process, the project team evaluated patterns in the data, with interpretation performed using a constant comparison method

RESULTS

Subjects

- Study 1 enrolled 41 subjects with moderate or severe CFL (CFL cohort)
- Study 2 included 29 subjects; 9 had moderate or severe FHL only and 20 had moderate or severe CFL, FHL, and GL (UFL cohort)
  - In the latter group, 11 subjects in addition to the 9 with FHL only completed interviews about their FHL (FHL cohort)
- Study participants ranged in age from 24–72 years, and most were female and white **(Table 1)**

Table 1. Demographics and Baseline Characteristics

Characteristic	Study 1	Study 2	
	CFL Cohort (n=41)	FHL Cohort (n=20)	UFL Cohort (n=20)
Age, years, mean (SD)	50.7 (20.8)	44.7 (15.6)	50.4 (13.8)
Age, years, range	25–69	24–72	24–72
Female, n (%)	36 (87.8)	14 (70.0)	14 (70.0)
White, n (%)	34 (82.9)	17 (85.0)	17 (85.0)
CFL severity at maximum smile, n (%)			
Moderate	28 (68.3)[a]	—	11 (55.0)
Severe	11 (26.8)	—	9 (45.0)
FHL severity at maximum eyebrow elevation, n (%)			
Moderate	—	8 (40.0)	7 (35.0)
Severe	—	12 (60.0)	13 (65.0)
GL severity at maximum frown, n (%)			
Moderate	—	—	10 (50.0)
Severe	—	—	10 (50.0)

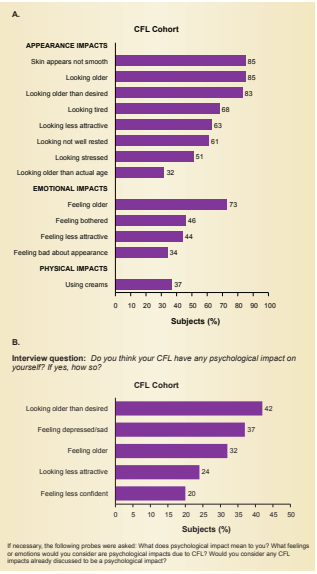
[a]Data shown for left side. Corresponding data for right side: 29 (70.7%) with moderate and 10 (24.4%) with severe CFL.
CFL, crow's feet lines; FHL, forehead lines; GL, glabellar lines; SD, standard deviation; UFL, upper facial lines.

Concept Elicitation Phase Interview

Study 1

- The most common appearance and behavioral impacts of CFL are shown in **Figure 2A**
- The most common psychological impacts of CFL were looking older than desired, feeling depressed/sad, feeling older, and looking less attractive **(Figure 2B)**

Figure 2. The Most Commonly Reported (≥20% of Subjects) Appearance, Emotional, and Physical Impacts (A) and Psychological Impacts (B) of Crow's Feet Lines in Study 1

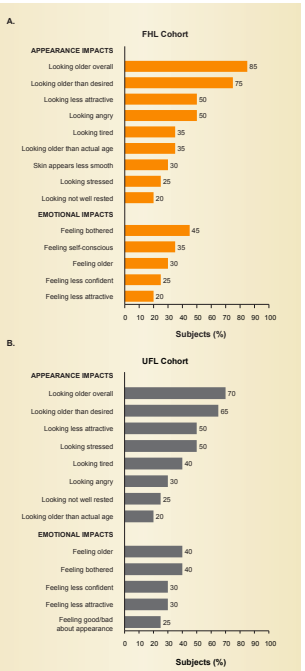


If necessary, the following probes were asked: What does psychological impact mean to you? What feelings or emotions would you consider are psychological impacts due to CFL? Would you consider any CFL impacts already discussed to be a psychological impact?

Study 2

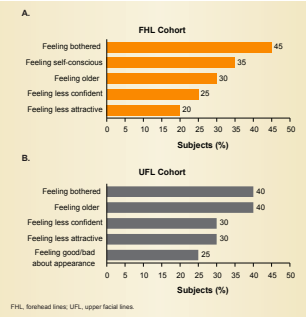
- The most common appearance and behavioral impacts of FHL and UFL are shown in **Figures 3A** and **3B**, respectively
- The most common psychological impacts of FHL were feeling bothered, feeling self-conscious, feeling older, and feeling less confident **(Figure 4A)**
- For the UFL cohort, the most common psychological impacts were feeling bothered, feeling older, feeling less confident, and feeling less attractive **(Figure 4B)**

Figure 3: The Most Commonly Reported (≥20% of Subjects) Appearance and Emotional Impacts of Forehead Lines (A) and Upper Facial Lines (B) in Study 2



FHL, forehead lines; UFL, upper facial lines.

Figure 4. The Most Commonly Reported (≥20% of Subjects) Psychological Impacts of Forehead Lines (A) and Upper Facial Lines (B) in Study 2



FHL, forehead lines; UFL, upper facial lines.

FLO-11 Questionnaire

- Several items of the FLO-11 questionnaire were frequently reported to be adequate measures of the psychological impact of CFL, FHL, and UFL overall. For example, Items 1, 3, and 5 elicited >68% response across all cohorts **(Table 2)**

Table 2. FLO-11 Items Reported as Psychological Impacts of Upper Facial Lines

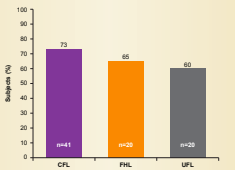
Interview question: *Do you think that this questionnaire asks you questions about the psychological impacts of CFL? If so, which questions ask you about the psychological impacts of CFL?*

FLO-11 Item, n (%)	Study 1	Study 2	
	CFL Cohort (n=41)	FHL Cohort (n=20)	UFL Cohort (n=20)
Item 1: Feeling bothered	28 (68)	16 (80)	14 (70)
Item 2: Looking older than desired	29 (71)	14 (70)	11 (55)
Item 3: Feeling less attractive	32 (78)	17 (85)	16 (80)
Item 4: Looking older than my actual age	19 (46)	15 (75)	13 (65)
Item 5: Looking less attractive	31 (76)	17 (85)	14 (70)
Item 6: Looking not well rested	17 (42)	11 (55)	10 (50)
Item 7: Skin appears less smooth	15 (37)	12 (60)	10 (50)
Item 8: Looking tired	19 (46)	13 (65)	13 (65)
Item 9: Looking stressed	22 (54)	14 (70)	14 (70)
Item 10: Looking angry	20 (49)	13 (65)	11 (55)
Item 11: Feeling good about appearance	23 (56)	16 (80)	14 (70)

CFL, crow's feet lines; FHL, forehead lines; UFL, upper facial lines.

- The FLO-11 items most frequently reported
  - CFL cohort: Item 3 (feeling unattractive; 78.0%) and Item 2 (feeling older than desired, 70.7%)
  - FHL cohort: Item 3 (85.0%) and Item 5 (feeling less attractive than desired; 85.0%)
  - UFL cohort: Items 3 (feeling unattractive; 80.0%) and 1 (bothered by lines), 5 (looking less attractive than desired), 9 (looking stressed), and 11 (feeling good/bad about appearance) (each 70.0%)
- The majority of subjects in each cohort reported that the FLO-11 questionnaire is a comprehensive measure of the psychological impacts of their particular facial lines **(Figure 5)**

Figure 5. Subjects Reporting That the FLO-11 Questionnaire Is a Comprehensive Measure of Psychological Impacts of Crow's Feet Lines, Forehead Lines, and Upper Facial Lines



CFL, crow's feet lines; FHL, forehead lines; UFL, upper facial lines.

CONCLUSIONS

- CFL, FHL, and UFL are associated with multiple psychological impacts, including feeling older, less attractive, bothered, self-conscious, and less confident
- These facial lines also affect self-perception, as subjects frequently reported looking older than their actual age, looking less attractive, and looking angry
- More than 50% of subjects reported that 6 items, 9 items, and all 11 items on the FLO-11 questionnaire assess the psychological impact of CFL, UFL, and FHL, respectively
- The majority of subjects reported that the FLO-11 is a comprehensive measure of the psychological impacts of their particular facial lines
- Based on these findings, the FLO-11 is an appropriate and comprehensive measure of the psychological impact of CFL, FHL, and UFL overall from the subject's perspective

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S Dayan is an employee of DeNova Research, which received remuneration for this research from Allergan plc. SG Yoelin serves as an investigator and on a speakers' bureau for Allergan plc. K De Boulle serves as a consultant and investigator and on a speakers' bureau for Allergan plc. IL Ferrusi was an employee of Allergan plc at the time of this research.

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