

Stefano Frara, MD

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Assistant Professor of Endocrinology, Università Vita-Salute San Raffaele, Milan, Italy

Specialist in Endocrinology, IRCCS Ospedale San Raffaele, Milan, Italy

Positions and Training

- May 2019 – present **Specialist in Endocrinology**, Endocrinology and Metabolic Disease Unit, IRCCS Ospedale San Raffaele, Milan
Main clinical activities: pituitary pathologies and related complications; onco-endocrinological pathologies; thyroid and parathyroid disorders; adrenal diseases; diagnosis through static and dynamic tests for the study of phosphocalcic metabolism.
- Feb 2019 – present **Assistant Professor**, Università Vita-Salute San Raffaele, Milan
Main Research topics: translational and clinical research in pituitary and bone diseases. Project's main goal: to assess new techniques for the early diagnosis of acromegaly and of pituitary tumors as well as their complications, specifically, osteoporosis and skeletal fragility. The research activities are also aimed at the evaluation of determinants of vertebral fractures in this setting.
- Oct 2018 – present **Lecturer**, Faculty of Medicine, Università Vita-Salute San Raffaele, Milan
Residency program in Endocrine and Metabolic diseases, International MD Program, MD Program, Dental School, Obstetric school
- Aug 2018 – Feb 2019 **Research Fellow**, Università Vita-Salute San Raffaele, Milan
Project title "*Epidemiological, clinical and densitometric determinants of therapeutic outcomes in pituitary pathologies with Growth Hormone (GH) excess (acromegaly)*".
Supervisor: Prof. A. Giustina
Clinical research in the field of neuro-endocrinology and bone metabolism diseases
- Aug 2017 – Jul 2018 **Research fellow**, Università Vita-Salute San Raffaele, IRCCS Ospedale San Raffaele, Milan
Project title: "*Epidemiological, clinical and densitometric determinants of therapeutic outcomes in pituitary pathologies with Growth Hormone (GH) deficit*".
Supervisor: Prof. A. Giustina
- Jan – Jul 2017 **Fellowship**, Università Vita-Salute, IRCCS Ospedale San Raffaele, Milan
Training on "*Hypothalamus-pituitary diseases, comorbidities and management before and after surgery and/or radiotherapy*"
Supervisors: Prof. P. Mortini & Prof. A. Giustina

Education

- Jan 2017 – Jul 2017 **Post-graduate School in Endocrine and Metabolic Diseases** (Full marks 70/70 cum laude)
Università Vita-Salute San Raffaele, IRCCS Ospedale San Raffaele, Milan
Director Prof. A. Giustina

- Oct 2014 to Dec 2016 **Post-graduate School in Endocrine and Metabolic Diseases**
 Training on bone diseases (total body, lumbar and hip DXA scans, DXA and Rx morphometry, CBCT), pituitary disorders and their comorbidities, thyroid, parathyroid and adrenal diseases, dynamic endocrine tests (stimulation or suppressive tests)
 University of Brescia, ASST Spedali Civili - Director Prof. Andrea Giustina
- Mar 2014 **Advanced training course in Pituitary disorders**, University of Brescia (Chair Prof. Andrea Giustina)
- Jul 2012 to Sep 2014 **Post-graduate School in Endocrine and Metabolic Diseases**
 Attending the ward and the outpatient clinic and taking care of chronic and acute patients affected by endocrine and geriatric diseases, diabetes and related complications (DMT2, DMT1, GDM, technologies), thyroid and parathyroid diseases, dynamic endocrine tests (stimulation or suppressive tests)
 Università Milano Bicocca, A.O. San Gerardo (Monza - Italy)
- Nov 2011 to Jan 2012 **National Licence to Practice**
- Oct 2005 to 2011 **Medical Degree**, University of Torino (Full marks 110/110). Final thesis entitled "*The GH-releasing effect of acylated ghrelin in normal subjects is refractory to GH acute auto-feedback but is inhibited after short-term GH administration inducing IGF1 increase*". Thesis project supervised by Associate Professor F. Broglio

Research and Scientific Activities

Positions in research studies on new drugs for GHD, bone and vitamin D metabolism, HIV-related metabolic complications, thyroid disorders.

- Principal Investigator trial "VITA"
- Sub-investigator in the project "Crinetics CRN-00808-02" (a phase-2 study)
- Sub-investigator in the project "Crinetics CRN-00808-03" (a phase-2 study)
- Sub-investigator in the project "Teva TV1106-IMM-30021" (a phase 3 study)
- Sub-investigator in the project "Teva TV1106-IMM-30022" (a phase 3 study)
- Sub-investigator in the project "Gilead GS-US-311-1717" (a phase 3 study)
- Local coordinator in the multicenter study entitled EDIPO: Endotrial SIE: Primitive hypothyroidism diagnosis and clinical management in Italy.

Scientific societies

Member of the following scientific societies:

- European Society of Endocrinology (ESE)
- Società Italiana di Endocrinologia (SIE)
- The Pituitary Society
- Società Italiana dell'Osteoporosi e delle Malattie del Metabolismo Minerale e Scheletrico (SIOMMMS)
- Glucocorticoid-Induced Osteoporosis Skeletal Endocrinology Group (GIOSEG)

Member of the Policy & Advocacy (P&A) group for the European Society of Endocrinology (ESE) since Oct 2020

Grants and Awards

- April 2017 **Travel grant – ESE**, 8th Skeletal Endocrinology Meeting, 3rd Translational ESE Bone course for the poster entitled "*Low calcium intake strongly predicts the risk of developing osteoporosis and vertebral fractures*" -

- March 2017 **Travel grant - Pituitary Society**, 15th International Pituitary Congress, Orlando for the poster entitled *“Bone safety of dual-release hydrocortisone (Plenadren®) in patients with hypopituitarism”*
- October 2016 **Best young abstract award**, XVI SIOMMMS national event. *“Prevalent radiological vertebral fractures in HIV-infected men in therapy with HHART are associated with high circulating levels of SHBG and FSH”*
- October 2016 **Best abstract award**, Fellow-day SIOMMMS 2016. *“Prevalence of radiological vertebral fractures in males affected by HIV in antiretroviral therapy (HAART) is influenced by their gonadal status”*
- May 2016 **Best poster award**, *“Sex differences in incidence and clinical expression of secondary osteoporosis in clinical practice”* - *“Incontri Italiani di Endocrinologia e Metabolismo”*
- March 2014 **Grant for attending** the Advanced training Course in Pituitary diseases, University of Brescia (Under the supervision of Prof. Andrea Giustina)

Associate editor for Minerva Endocrinologica since Nov 2020.

Editor for Pituitary and Endocrine.

Reviewer for Journal of Clinical Endocrinology and Metabolism, Endocrine, Pituitary, Metabolism, Hormones, Expert Opinion on Pharmacotherapy, International Journal of Endocrinology, Journal of Endocrinological Investigation, BMC Musculoskeletal disorders, Minerva Endocrinologica, Reviews in Endocrine and Metabolic Disorders.

Invited speaker and chair in more than 40 Italian and International Scientific Meetings.

Publications

- DI FILIPPO L, ALLORA A, DOGA M, FORMENTI AM, LOCATELLI M, ROVERE QUERINI P, **FRARA S**, GIUSTINA A. **Vitamin D levels are associated with blood glucose and BMI in COVID-19 patients, predicting disease severity.** *J Clin Endocrinol Metab.* 2022; 107(1): e348-e360.
- PERTICONE F, MAGGIORE R, MARI G, **FRARA S**, BALDASSARRE P, DOGLIONI C, LENA MS, ROSATI R, LANZI R, GIUSTINA A. **Malignancy risk in indeterminate thyroid nodules with Hürthle cells: role of autoimmune thyroiditis.** *Endocrine.* 2021; *Online ahead of print.*
- DI FILIPPO L, ALLORA A, LOCATELLI M, ROVERE QUERINI P, **FRARA S**, BANFI G, GIUSTINA A. **Hypocalcemia in COVID-19 is associated with low vitamin D levels and impaired compensatory PTH response.** *Endocrine* 2021; 74(2): 219-225.
- **FRARA S**, LOLI P, ALLORA A, SANTINI C, DI FILIPPO L, MORTINI P, FLESERIU M, GIUSTINA A. **COVID-19 and hypopituitarism.** *Rev Endocr Metab Disord* 2021; 13: 1-17.
- TRITOS N A, K FAZELI P K, MCCORMACK A, MALLEA-GIL S M, PINEYRO MM , CHRIST-CRAIN M, **FRARA S**, LABADZHAN A, IOACHIMESCU A G, SHIMON I, TAKAHASHI Y, GURNELL M, FLESERIU M. **“Pituitary Society Delphi Collaborative Group” Pituitary Society Delphi Survey: An international perspective on endocrine management of patients undergoing transsphenoidal surgery for pituitary adenomas.** *Pituitary* 2021; 20:1-10.
- DI FILIPPO L, **FRARA S**, GIUSTINA A. **The emerging osteo-metabolic phenotype of COVID-19: clinical and pathophysiological aspects.** *Nat Rev Endocrinol* 2021; 17(8): 445-446.
- ULIVIERI F M, BANFI G, CAMOZZI V, COLAO A, FORMENTI A M, **FRARA S**, LOMBARDI G, NAPOLI N, GIUSTINA A. **Vitamin D in the Covid-19 era: a review with recommendations from a G.I.O.S.E.G. expert panel.** *Endocrine.* 2021; 72(3): 597-603.
- MUNAFÒ A, **FRARA S**, PERICO N, DI MAURO R, CORTINOVIS M, BURGALETTO C, CANTARELLA G, REMUZZI G, GIUSTINA A, BERNARDINI R. **In search of an ideal drug for safer treatment of obesity: The false promise of pseudoephedrine.** *Rev Endocr Metab Disord.* 2021; 22(4): 1013-25.

- **FRARA S, ALLORA A, CASTELLINO L, DI FILIPPO L, LOLI P, GIUSTINA A. COVID-19 and the pituitary.** *Pituitary*. 2021; 24(3): 465-481.
- DI FILIPPO L, DOGA M, **FRARA S, GIUSTINA A. Hypocalcemia in COVID-19: Prevalence, clinical significance and therapeutic implications.** *Rev Endocr Metab Disord*. 2021; 1-10. Online ahead of print.
- **FRARA S, ALLORA A, DI FILIPPO L, FORMENTI AM, LOLI P, POLIZZI E, TRADATI D, ULIVIERI F M, GIUSTINA A. Osteopathy in mild adrenal Cushing's syndrome and Cushing disease.** *Best Pract Res Clin Endocrinol Metab*. 2021; 35(2): 1015-15.
- GIUSTINA A, LEGG E, CESANA B M, **FRARA S, MORTINI P, FLESERIU M. Results from ACROCOVID: an international survey on the care of acromegaly during the COVID-19 era.** *Endocrine*. 2021; 71(2): 273-280.
- DI FILIPPO L, FORMENTI AM, DOGA M, **FRARA S, ROVERE-QUERINI P, BOSI E, CARLUCCI M, GIUSTINA A. Hypocalcemia is a distinctive biochemical feature of hospitalized COVID-19 patients.** *Endocrine* 2021; 71(1): 9-13.
- **FRARA S, RODRIGUEZ-CARNERO G, FORMENTI AM, MARTINEZ-OLMOS MA, GIUSTINA A, CASANUEVA FF. Pituitary Tumors Centers of Excellence.** *Endocrinol Metab Clin North Am*. 2020; 49(3): 553-564.
- FORMENTI AM, TECILAZICH F, **FRARA S, GIUBBINI R, DE LUCA H, GIUSTINA A. Body mass index predicts resistance to active vitamin D in patients with hypoparathyroidism.** *Endocrine*. 2019; 66(3): 699-700.
- CHILOIRO S, GIAMPIETRO A, **FRARA S, BIMA C, DONFRANCESCO F, FLESERIU C M, PONTECORVI A, GIUSTINA A, FLESERIU M, DE MARINIS L, BIANCHI A. Effects of Pegvisomant and Pasireotide LAR on Vertebral Fractures in Acromegaly Resistant to First-generation SRLs.** *J Clin Endocrinol Metab*. 2020; 105(3).
- GIUSTINA A, BARKAN A, BECKERS A, BIERMASZ N, BILLER BMK, BOGUSZEWSKI C, BOLANOWSKI M, BONERT V, BRONSTEIN MD, CASANUEVA FF, CLEMMONS D, COLAO A, FERONE D, FLESERIU M, **FRARA S, GADELHA MR, GHIGO E, GURNELL M, HEANEY AP, HO K, IOACHIMESCU A, KATZNELSON L, KELESTIMUR F, KOPCHICK J, KRSEK M, LAMBERTS S, LOSA M, LUGER A, MAFFEI P, MARAZUELA M, MAZZIOTTI G, MERCADO M, MORTINI P, NEGGERS S, PEREIRA AM, PETERSENN S, PUIG-DOMINGO M, SALVATORI R, SHIMON I, STRASBURGER C, TSAGARAKIS S, , VAN DER LEY A J, WASS J, ZATELLI M C, MELMED S. A Consensus on the Diagnosis and Treatment of Acromegaly Comorbidities: An Update.** *J Clin Endocrinol Metab*. 2020; 105(4).
- FORMENTI AM, DOGA M, **FRARA S, RITELLI M, COLOMBI M, BANFI G, GIUSTINA A. Skeletal fragility: an emerging complication of Ehlers-Danlos syndrome.** *Endocrine* 2019; 63(2): 225-230.
- TECILAZICH F, FORMENTI A M, **FRARA S, GIUBBINI R, GIUSTINA A. Treatment of hypoparathyroidism.** *Best Pract Res Clin Endocrinol Metab*. 2018; 32(6): 955-964.
- **FRARA S, LOSA M, DOGA M, FORMENTI AM, MORTINI P, MAZZIOTTI G, GIUSTINA A. High prevalence of radiological vertebral fractures in patients with TSH-secreting pituitary adenoma.** *J Endocr Soc*, 2018; 2(9): 1089-99.
- MAZZIOTTI G, FORMENTI AM, **FRARA S, DOGA M, GIUSTINA A. Vitamin D and glucocorticoid-induced osteoporosis.** *Front Horm Res*, 2018; 50: 149-60.
- VEZZANI S, GIANNETTA E, ALTIERI B, BARBONETTI A, BELLASTELLA G, CERTO R, CIGNARELLI A, CINTI F, D'ANDREA S, DI DALMAZI G, **FRARA S, GARELLI S, GIUFFRIDA G, MAIORINO MI, MELE C, MEZZA T, PANI MG, SAMÀ MT, SATTÀ C, SANTI D. An Italian survey of compliance with major guidelines for L-thyroxine of primary hypothyroidism.** *Endocr Pract*, 2018; 24(5): 419-28.
- MAZZIOTTI G, **FRARA S, MOSCA A. Primary hyperparathyroidism in prostate cancer: guilty or not guilty?** *Endocrine*, 2018; 62(2): 271-273.
- MAZZIOTTI G, **FRARA S, GIUSTINA A. Pituitary diseases and bone.** *Endocr Rev* 2018; 39(4): 440-88.
- CHILOIRO S, MAZZIOTTI G, GIAMPIETRO A, BIANCHI A, **FRARA S, MORMANDO M, PONTECORVI A, GIUSTINA A, DE MARINIS L. Effects of pegvisomant and somatostatin receptor ligands on incidence of vertebral fractures in patients with acromegaly.** *Pituitary*, 2018; 21(3): 302-8; correction 21(3): 309.
- **FRARA S, CHILOIRO S, PORCELLI T, GIAMPIETRO A, MAZZIOTTI G, DE MARINIS L, GIUSTINA A. Bone safety of dual-release hydrocortisone in patients with hypopituitarism.** *Endocrine*, 2018; 60(3): 528-31.
- MAZZIOTTI G, FORMENTI AM, **FRARA S, OLIVETTI R, BANFI G, MEMO M, MAROLDI R, GIUBBINI R, GIUSTINA A. High prevalence of radiological vertebral fractures in women on TSH-suppressive therapy for thyroid carcinoma.** *J Clin Endocrinol Metab*, 2018; 103(3): 956-64.

- MAZZIOTTI G, FORMENTI AM, PANAROTTO MB, ARVAT E, CHITI A, CUOCOLO A, DOTTORINI ME, DURANTE C, AGATE L, FILETTI S, FELICETTI F, FELICE A, PACE L, PELLEGRINO T, RODARI M, SALVATORI M, TRANFAGLIA C, VERSARI A, VIOLA D, **FRARA S**, BERRUTI A, GIUSTINA A, GIUBBINI R. **Real-life management and outcome of thyroid carcinoma-related bone metastases: results from a nationwide multicenter experience.** *Endocrine*, 2018; 59(1): 90-101.
- MAZZIOTTI G, MOSCA A, **FRARA S**, VITALE G, GIUSTINA A. **Somatostatin analogs in the treatment of neuroendocrine tumors: current and emerging aspects.** *Expert Opin Pharmacother*, 2017; 18(16): 1679-89.
- MAZZIOTTI G, FORMENTI AM, **FRARA S**, ROCA E, MORTINI P, BERRUTI A, GIUSTINA A. **Management of endocrine disease: Risk of overtreatment of patients with adrenal insufficiency: current and emerging aspects.** *Eur J Endocrinol*, 2017; 177(5): R231-R248.
- PEDERSINI R, MONTEVERDI S, MAZZIOTTI G, AMOROSO V, ROCA E, MAFFEZZONI F, VASSALLI L, RODELLA F, FORMENTI AM, **FRARA S**, MAROLDI R, BERRUTI A, SIMONCINI E, GIUSTINA E. **Morphometric vertebral fractures in breast cancer patients treated with adjuvant aromatase inhibitor therapy: a cross-sectional study.** *Bone*, 2017; 97: 147-52.
- MAZZIOTTI G, FORMENTI AM, **FRARA S**, MAFFEZZONI F, DOGA M, GIUSTINA A. **Diabetes in Cushing disease.** *Curr Diab Rep*, 2017; 17: 32.
- MAZZIOTTI G, MAFFEZZONI F, **FRARA S**, GIUSTINA A. **Acromegalic osteopathy.** *Pituitary*, 2017; 20(1): 63-9.
- GIUSTINA A, **FRARA S**, SPINA A, MORTINI P. **Chapter 9 “The Hypothalamus”**, pp. 291-327, in *“The Pituitary” Fourth Edition*, edited by Melmed S., Elsevier, London, 2017.
- MAFFEZZONI F, **FRARA S**, DOGA M, MAZZIOTTI G, GIUSTINA A. **New medical therapies of acromegaly.** *Growth Horm IGF Res*, 2016; 58-63.
- MAFFEZZONI F, MADDALO M, **FRARA S**, MEZZONE M, ZORZA I, BARUFFALDI F, DOGLIETTO F, MAZZIOTTI G, MAROLDI R, GIUSTINA A. **High-resolution-cone beam tomography analysis of bone microarchitecture in patients with acromegaly and radiological vertebral fractures.** *Endocrine*, 2016; 54(2): 532-42.
- **FRARA S**, MAFFEZZONI F, MAZZIOTTI G, GIUSTINA A. **Current and emerging aspects of diabetes mellitus in acromegaly.** *Trends Endocrinol Metab*. 2016; 27(7): 470-83.
- MAFFEZZONI F, FORMENTI AM, MAZZIOTTI G, **FRARA S**, GIUSTINA A. **Current and future medical treatments for patients with acromegaly.** *Expert Opin Pharmacother*. 2016; 17(12): 1631-42.
- MAZZIOTTI G, DOGA M, **FRARA S**, MAFFEZZONI F, PORCELLI T, CERRI L, MAROLDI R, GIUSTINA A. **Incidence of morphometric vertebral fractures in adult patients with growth hormone deficiency.** *Endocrine*. 2016; 52: 103-10.
- **FRARA S**, MAFFEZZONI F, MAZZIOTTI G, GIUSTINA A. **The modern criteria for medical management of acromegaly.** *Progr Mol Biol Transl Sci*, 2016; 138: 63-83.
- GIUSTINA A, **FRARA S**. **Fattori endocrini nella fisiopatologia ossea – Neuroendocrinologia dell’osso.** *LigandAssay*. 2015; 20(3): 182-3.
- MAZZIOTTI G, **FRARA S**, GIUSTINA A. **Metabolic Complications of Acromegaly**, da *Comorbidities in Acromegaly* edited by P. Chanson, 2015.
- BENSO A, GRAMAGLIA E, OLIVETTI I, TOMELINI M, GIGLIARDI VR, **FRARA S**, CALVI E, BELCASTRO S, ST PIERRE DH, GHIGO E, BROGLIO F. **The GH-releasing effect of acylated ghrelin in normal subjects is refractory to GH acute auto-feedback but is inhibited after short-term GH administration inducing IGF1 increase.** *Eur J Endocrinol*. 2013; 168(4): 509-14.

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